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ABSTRACT

The Technical Interdisciplinary Program is a Title III, Elementary and Secondary Education Act of 1965, federally funded exemplary program. Franklin Pierce High School is the only high school in the state of Washington with a program of this nature. The Technical Interdisciplinary Program is designed to incorporate two or more disciplines into one meaningful experience. In this program, English, math, social studies, and the building trades occupations have been combined into this one course. Students are enrolled as juniors in a four hour block of time. At present, the social studies portion of the program, which is undergoing development, is taught through lecture and discussion. The information that the students are studying is concerned with the working man's place in his home, neighborhood, job, and community, and how all of these facets fit into the state, nation, and the world. The math, English, and technical portion of the program are presented through teacher constructed, individual units. The students are required to complete a written unit on a particular construction objective which incorporates certain math and English skills necessary to fully understand and master the objectives. The students then apply the knowledge gained in the construction of a scaled model of a residential home. (Author/JM)

TIP

Technical Interdisciplinary Program

FRANKLIN PIERCE SCHOOL DISTRICT

Tacoma, Washington

Revised October 1974

The Technical Interdisciplinary Program is a Title III, federally funded exemplary program. By exemplary, we mean one of a kind. Franklin Pierce High School is the only high school in the state with a program of this nature.

Just what do we mean by the Technical Interdisciplinary Program? It is a program designed to incorporate two or more disciplines into one meaningful experience. In the case of our interdisciplinary program, we have combined math, English, social studies and the building trades occupations into this one course.

Let me explain how this course was conceived. First of all, we as teachers are aware of the fact that approximately 80% of our graduating students do not attend a college or university for further study. What becomes of this 80% of our students? Some will attend a community college for one or two years, some will enter vocational schools and apprenticeship programs at the two area vocational-technical schools, but a large percentage of these students will simply "go to work."

Those students who do not plan to enter a college or university pretty well know this by the time they are juniors in high school. As a result, they see no need to continue with such pre-college courses as English or social studies. They "turn-off" to this type of education and seek alternate routes to follow in order to graduate.

If these alternate routes are not available to them, they are faced with two choices, drop-out or sit through courses that hold no interest or meaning to them.

The idea behind interdisciplinary education stemmed from this need for alternate routes for students to follow.

The math, English and industrial-technical department heads were aware of this problem. After discussing it, we undertook the development of a program that fit the need of some of the students in our school. The Technical Interdisciplinary Program is a result of this development.

Basically, this is how the program functions. Students are enrolled as juniors in a four hour block of time. During this period of time, the students are engaged in a number of meaningful activities. At present, the social studies portion of the program, which is undergoing development, is taught through lecture and discussion. The information that the students are studying is concerned with the working man's place in his home, neighborhood, job and community, and how all of these facets fit into the state, nation and the world.

The math, English and technical portion of the program are presented through teacher constructed, individual units. The students are required to complete a written unit on a particular construction objective which incorporates certain math and English skills necessary to fully understand and master the objectives.

The students then apply the knowledge gained in the construction of a scaled model of a residential home. When possible, the students will also do full scale construction to better understand methods and problems encountered.

We are not trying to make carpenters, cement finishers, painters or cabinet makers out of these students. We are giving them an alternate route to follow which leads toward high school graduation.

We are not trying to give these students a whole gamut of new and exciting information about math, English and social studies; but instead, we are trying to teach them to apply the information that they have been learning for the past ten years. We do this by placing them in situations

where they have to apply certain gained knowledge in order to continue with the "hands-on" construction phases which they all seem to enjoy.

This same procedure is followed during the senior year, until all of the objectives for the course have been completed. When a student completes all of the stated objectives, and if time permits, he is encouraged to secure off-campus employment in one of the building trades occupations. Under this phase of the program, the student is able to gain "in-depth" knowledge about an area of interest to him.

We have found that this type of education is more meaningful to the students and is virtually impossible to duplicate in the classroom.

TECHNICAL INTERDISCIPLINARY PROGRAM (T.I.P.)

PROGRAM PURPOSE, NEEDS AND OBJECTIVES

I. Purpose

The T.I.P. is an academic and technical program completely interrelated in which the individual student should find reason for his immediate educational program and a rationale for graduate training, whatever his immediate program or eventual training may be.

II. Needs

The high school needs to remove the restraints of a sterile academic environment and establish an institution responsive to change and responsible in its purpose for students, faculty, community-society.

A. Student Needs:

1. To find purpose in those requirements imposed for graduation.
2. To find success by regular standards in meeting requirements.
3. To find success for himself by his own standards.
4. To have curricular alternatives through which academic and technical goals and purpose may be achieved.
5. To experience community resources as an application and expansion of his educational program.

B. Faculty Needs:

1. A workable conception of individualization of instruction (humanness).
2. A system of instruction in time and flexibility and resources that permits and encourages interdisciplinary instruction.

C. Community-Society Needs:

1. The patrons need a system of secondary education that permits and encourages students to succeed in school, prepared in academic and technical skills so as to be able to be committed to wise decisions. This would be in itself a wise use of tax monies.

III. Objectives

The T.I.P. was/is designed to establish an alternative school-within-a-school in which a student can meet all requirements for graduation and be prepared for postgraduate responsibility through a curriculum of related academic and technical skills in which he participates on a self-education basis regardless of ability.

A. For the student:

1. That he will succeed as judged by joint academic and technical standards.
2. That he will participate in varied instructional patterns encouraging individualized learning.
3. That he will participate in community technologies as an expansion of the classroom.
4. That he will utilize resources, equipment and materials relevant and contemporary as a major part of his educational program.

B. For the faculty:

1. An expansion of the block-of-time to 4-5 hours permitting flexibility of scheduling, varied instructional models (individual, small group, large group, etc.) and extensive laboratory experience, on or off campus.
2. Expansion of technical and curricular offerings to meet all basic requirements for graduation and enlarge the opportunity for student enrollment.

3. Development of teaching management systems in which the student proceeds in any of three modes: (1) by objectives and by performance; (2) by pass-fail (non-college); (3) by traditional grading.

C. For the community:

1. Greatly expanded use of community technologies as a major part of laboratory experience.
2. Greatly expanded use of para-professionals either on or off campus as vital extensions of instructional patterns.

COURSE OBJECTIVES

First Year

1. Each student will develop an understanding of construction techniques and terminology and the application of mathematics and communications within the building trades.
2. Each student will learn to work independently on assigned written work units.
3. Each student will work as a team member on a home model in the classroom.
4. Each student will make frequent field trips to selected building sites to supplement his classroom work.

Second Year

1. Each student will be directly involved with the application of the knowledge he gained in the first year.
2. Each student will complete his required written assignments in the work units and his work on his home model.
3. Each student will have the opportunity to be engaged in an off-campus work experience.
4. Each student will pursue a program of independent study in the building trades.

BUILDING TRADES OBJECTIVES

Carpentry: First year 1-11
Second year 12-17

Upon completion of this course, the student will have knowledge of and be proficient in:

1. Using with safety the majority of hand and power tools used in building construction.
2. Selecting an adequate building site and using leveling instruments.
3. Reading and understanding construction blueprints.
4. Interpreting and applying various building codes used in this area.
5. Identifying and selecting building materials.
6. Constructing footing and foundation forms, pouring concrete, and stripping forms.
7. Framing and laying various subfloors.
8. Laying plates and framing exterior and interior walls with door and window openings included.
9. Leveling, aligning and sheathing exterior walls.
10. Framing joists and installing backing.
11. Framing rafters.

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12. Sheathing roofs and installing cornices and gutters.
13. Applying various roofing materials.
14. Installing exterior doors, windows and various siding.
15. Interior finish construction.
16. Painting the exterior and interior of the structure.
17. Upon completion of the preceding objectives, each student will participate in an independent study program and/or off-campus work experience.

THE ROLES OF MATHEMATICS AND COMMUNICATIONS IN THE TECHNICAL INTERDISCIPLINARY PROGRAM

It is understood that mathematics and communications are supplementary to the central curriculum of carpentry.

The emphases of the mathematics and communications curricula are upon their place and value within the building trades. Each unit of study is focused upon a significant area of the building industry that requires adequate mathematics and communication skills. Non-relevant mathematics and English do not have a place in this program.

Our society is not only demanding skilled men in the building trades but educated citizens who take an active part in industrial, labor and community affairs. It is the role of these two supplementary disciplines within the Technical Interdisciplinary Program to progress this education.

MATHEMATICS

The objectives of the mathematics discipline are:

1. To review computational skills using:
   a. whole numbers
   b. rational numbers
   c. decimal fractions
2. To understand measurement:
   a. linear
   b. area - square measure
   c. volume - cubic measure
   d. board feet
3. To understand and use ratio and proportion.
4. To understand percentage:
   a. taxes
   b. discounts
   c. ordering extra amounts of material
   d. commission
5. To set up leveling instrument or transit and shoot grade readings. To understand raising or lowering ground level to maintain a certain grade level.
6. To read and use the carpenters square:
   a. lengths of rafters
   b. angle cuts on rafters
7. To understand and make a bid on the materials and labor for building a house. To be done from the blueprints of some specific home.

Each of these concepts will be introduced and studied with an eye to their use in the construction field, primarily carpentry.

COMMUNICATIONS

It is the objective of communications:

1. To instill within the student a confidence and satisfaction in his understanding and accomplishment with his language and what it conveys;
2. To teach communication skills that are comparable to those of students in the regular academic program but are directed at adaptability within the building trades;
3. To help students realize individual talents and express them verbally and in writing;
4. To teach communication facility to those students who think they have a future in the building trades.

THE PRE-TEST/POST-TEST PROGRAM OF THE TECHNICAL INTERDISCIPLINARY PROGRAM

Measurement of student progress in the Technical Interdisciplinary Program is a prime means for determining the value of the program.

The pre-test/post-test program is now completely constructed in all three disciplines of the Technical Interdisciplinary Program. By the end of the school year 1971-72, statistical information will be available for evaluation of the entire program.

The following pages provide copies of the pre-test/post-test program that will be administered in carpentry, mathematics and communications in the school year 1971-72.

Note: The pre-test/post-test in mathematics is a standardized skill test published by Science Research Associates titled "Basic Skills in Arithmetic Test" by Wrinkle, Sanders and Kendel.

Supplementary evaluations are also included in this section.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Pre-Test and Post-Test
CARPENTRY

Name_____

1-10 List ten (10) different factors to take into consideration when selecting a building site:

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11-20 Using the proper architectural symbols, indicate the following:

11. Exterior wall

12. Exterior window

13. Garage door with apron

14. Sliding glass door

15. 110 duplex outlet

16. Overhead light

17. Interior swinging door

18. TV outlet

19. Bi-fold door

20. Switch

21-23 List the three plumbing fixtures that are found in all full bathrooms:

21.

22.

23.

24-25 Hallways are a specific width. In recent years the width has changed.

What was the old width _____, and what is the new width _____?

26. What are the features that differentiate a linen closet from a wardrobe closet?

27-30 There are four different electrical symbols found in all utility rooms. Indicate these symbols:

27.

28.

29.

30.

31. What is the size of a standard fireplace face opening?

32. How is 4" brick veneer indicated on a floor plan?

33. What is the size of a standard footing and foundation?

34. What is the size of a screened vent?

35. What is the size of crawl hole or access door?

36. How thick is the concrete of a normal garage floor?

37. What is the proper slope of a garage floor?

38. When using a beam and decking subfloor, how far apart should the beams be located?

39. When using a beam and 2-4-1 subfloor, how far apart should the pier blocks and posts be set?

40. When using a joist floor, what is the distance between joists?

41. What is the name of the structural member that is bolted on top of the foundation?

42-47 Define the following structural members:

42. Stud:

43. Cripple:

44. Header:

45. Trimmer:

46. Sole plate:

47. Top plate:

48-50 What is the width and thickness of the following structural members?

48. Window and door header:

49. Stud:

50. Sole Plate:

51. What is the standard length of studs used in this area?

52-58 What is the length of headers for the following door and window sizes?

52. 3'0" x 6'8" Entry Door:

53. 2'6" x 6'8" Bedroom Door:

54. 16'0" x 7'0" Overhead Garage Door:

55. 2 2'0" x 6'8" Sliding Wardrobe Doors:

56. 2 3'0" x 6'8" Bi-fold Doors:

57. 8'0" x 4'0" Window:

58. 3'0" x 3'0" Window:

59-60 There are two nail sizes used to frame most buildings in this area. Indicate these sizes:

59.

60.

61. What is the width and thickness of the material used for ceiling joists?

62. Define span:

63. Maximum span for ceiling joists is determined by F.H.A. and city/county codes. What is this span?

64. Define backing:

65. What is the size of the material used for backing?

66-68 There are three construction factors that make it possible for the top of the exterior windows to butt against the bottom of the soffit plywood. What are these three factors?

66.

67.

68.

69-70 If the span of room surpasses the F.H.A. and city/county codes for ceiling joist, an additional supportive member must be installed. What is this member and how is it constructed?

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Pre-Test and Post-Test
CARPENTRY

Name_____

1-6 There are 6 different roof types used in this area. Name these roof types:

1.

2.

3.

4.

5.

6.

7. The basic tool used to lay out rafter cuts and lengths is a _____.

8-15 Define the following roof framing members:

8. Common Rafter

9. Hip Rafter

10. Valley Jack Rafter

11. Cripple Rafter

12. Purlin

13. Ridge Board

14. Collar Beam

15. Hip Jack Rafter

16. Define SPAN:

17. Define RUN:

18-20 There are 3 different cuts made on a common rafter. Name these.

18.

19.

20.

21. Define SHEATHING:

22-23 There are 2 methods of cornice construction used in this area. Name them.

22.

23.

24-28 Define the following cornice construction terms.

24. Lookout

25. Fascia Board

26. Frieze Board

27. Soffit Panel

28. Gutter

29-31 Name the 3 most common roofing material types used in this area.

29.

30.

31.

32-35 Define the following roofing terminology:

32. Underlayment

33. Square of Shingles

34. Exposure

35. Shingle Butt

36-37 The two most common materials that are used in the construction of window frames in this area are:

36.

37.

38-40 Name 3 different door types that are found on most residential homes in this area.

38.

39.

40.

41-47 What is the standard size of windows and doors used in the following rooms. Give answers in width and height.

41. Bedroom door _____

42. Bedroom window _____

43. Bathroom window _____

44. Garage door _____

45. Living room window _____

46. Entrance door _____

47. Kitchen window _____

48. Define BEVEL SIDING and tell where it is used.

49. Define TEX 1-11 SIDING:

50. Define CHANNEL SIDING and tell where it is used.

51. Define BRICK or STONE VENEER:

52. Prior to installation of exterior siding to a structure, a material must be applied. What is this material?

53. The process of closing cracks in siding and around windows is called _____.

54-56 There are 3 ways in which heat is transmitted. These are:

54.

55.

56.

57-58 There are 2 types of insulation materials used in this area. Name them.

57.

58.

59. Define VAPOR BARRIER:

60-62 Ventilation for unheated attics is necessary. Name 3 types of attic ventilators used in this area.

60.

61.

62.

63-64 Methods of interior wall covering have changed in recent years. What was the old method and what is the new method.

63. Old:

64. New:

65-68 Define the following interior wall and ceiling finish materials:

65. V-grooved paneling

66. Ceiling tile

67. Joint & fastener concealment

68. Lumber paneling

69. Prior to installing finish flooring to a kitchen, a material must be laid. Name this material_____.

70-72 There are 3 basic materials used to finish floors in this area. Name these materials.

70.

71.

72.

73-75 Using the answers to question 70-72, indicate which rooms in a new home you would most likely find those finish flooring materials.

73.

74.

75.

76. After the interior walls and floors are finished, there is a construction material applied to the intersection of walls and floors. Name this material_____.

77-91 Define the following door and interior trim terms.

77. Pre-hung door:

78. Split jamb door unit:

79. Threshold:

80. Head casing:

81. Door butt:

82. Side casing:

83. Stool:

84. Shelf & pole:

85. By-pass door:

86. Hollow core door:

87. Solid core door:

88. Panel door:

89. Pocket door:

90. Roll-up garage door:

91. Apron:

92-93 There are 2 basic paint types used on exterior and interior painting. Name these paint types.

92.

93.

94. Prior to applying the finish coats of paint to a structure, a painting process must be completed first. What is this process called?

_____

95-97 Define the following painting problems.

95. Peeling:

96. Blistering:

97. Chalking:

98. Interior millwork is finished natural. Name the finish material used on interior millwork to obtain this natural finish._____

99-100 Wood floor finishing requires 3 major steps. Name 2 of these major steps.

99.

100.

COMMUNICATIONS PRE-TEST/POST-TEST

Test #1

THE FOLLOWING ARE 50 TERMS THAT ARE FREQUENTLY USED IN THE COURSE AND CONSTRUCTION WORK OF THIS PROGRAM. YOU ARE TO SPELL THEM AS ACCURATELY AS YOU CAN.

1. Ridge Board
2. Fascia
3. Cornice
4. Asphalt Shingles
5. Pitch
6. Purlin
7. Gutter
8. Soffit
9. Ledger
10. Downspout
11. Aluminum
12. Ventilators
13. Frieze Board
14. Laminated
15. Panels
16. Vinyl
17. Eave
18. Galvanized
19. Veneer
20. Channel
21. Sheathing
22. Exposure
23. Coverage
24. Mineral
25. Flashing
26. Pneumatic
27. Underlayment
28. Straightedge
29. Wedge
30. Casement
31. Threshold
32. Vertical
33. Horizontal
34. Interior
35. Exterior
36. Weather
37. Preservative
38. Primer
39. Textured
40. Reflective
41. Radiation
42. Visqueen
43. Gypsum
44. Prefabricated
45. Ceramic
46. Miter
47. Enamel
48. Lacquer
49. Sealer
50. Latex

COMMUNICATIONS
Pre-Test/Post-Test

TEST #2

The following are 25 terms that are frequently used in the Technical Interdisciplinary Program. You are to define each term as accurately as you can.

1. combination square

2. miter box

3. aluminum level

4. commercial zone

5. residential zone

6. Uniform Building Code

7. building permit

8. building official

9. exterior bearing wall

10. fire-stops

11. sheathing

12. footing

13. cement

14. reinforcing rod

15. anchor bolts

16. subfloor

Test #2 continued

17. mud sill

18. joists

19. pneumatic nailer

20. girders

21. sole plate

22. cripple stud

23. header

24. rough sill

25. align

ANSWER COLUMN

Add.

(1) 7 + 0

(2) 8 + 9 + 2 + 6

(3) 36 + 98 + 65 + 18

(4) 479 + 894 + 273 + 686

Subtract.

(5) 763 − 464

(6) 4730 − 4041

(7) 3001 − 485

Multiply.

(8) 0 × 8

(9) 789 × 67

(10) 945 × 308

(11) 820 × 40

Divide.
Write remainders, if any, as common fractions.

(12) $4\overline{)0}$

(13) $3\overline{)2830}$

(14) $96\overline{)76801}$

(15) $42\overline{)8526}$

Change to its simplest form.

(16) $\frac{6}{10} =$

(17) $3\frac{4}{8} =$

(18) $14\frac{3}{3} =$

Change to a mixed number.

(19) $\frac{19}{8} =$

Change to an improper fraction.

(20) $2\frac{3}{4} = \frac{\quad}{4}$

(21) $\frac{2}{3} = \frac{\quad}{6}$

(22) 7 is what part of 28?

Add.

(23) $39 + 5\frac{7}{12}$

(24) $15\frac{3}{4} + 12\frac{1}{2}$

(25) $\frac{3}{4} + 4\frac{1}{3} + 5\frac{5}{6}$

Subtract.

(26) $\frac{1}{2} - \frac{1}{3}$

(27) $15 - 6\frac{3}{4}$

(28) $23\frac{1}{4} - 8\frac{2}{3}$

For items 29 through 36, each answer should be written in its simplest form.

(29) $\frac{1}{2}$ of $\frac{1}{3} =$

(30) $24 \times \frac{3}{4} =$

(31) $\frac{2}{3} \times 5 =$

30

25

ANSWER COLUMN

Multiply.

(32) $15 \times 3\frac{2}{3} =$ (33) $2\frac{1}{2} \times 3\frac{3}{4} =$

Divide.

(34) $\frac{1}{2} \div 2 =$ (35) $\frac{4}{5} \div \frac{1}{5} =$ (36) $6 \div \frac{2}{3} =$

(37) Write 15 thousandths as a decimal.

(38) Which of the following is the way you would read .06?
(six-tenths) (six) (six-thousandths) (six-hundredths)

Rearrange the numbers in the next two problems so that the largest number is first and the smallest is last.

(39) .7 .007 .08 (40) .043 .23 .3

(41) Change .9 to a common fraction.

(42) Change $\frac{1}{9}$ to a decimal. (Leave the remainder as a common fraction after the second decimal place.)

(43) $.7 + .8 + .9 =$ (44) $\$5.76 + \$25.90 + \$.49 =$

(45) $\$73.80 - \$7.17 =$

(46) Take \$8.11 from \$10.00. The remainder is

(47) $\$5.47 \times 10 =$ (48) $.35 \div 10 =$

Place the decimal point correctly in the answers to the following problems. Add any zeros that may be needed.

(49) $.06 \times .9 = 54$

(50) $\$3.75 \times .6 = \$2250$

(51)
$$25\overline{)9.25} = 37$$
75
175
175
000

(52)
$$25\overline{).925} = 37$$
75
175
175
000

(53)
$$.25\overline{).925} = 37$$
75
175
175
000

(54)
$$2.5\overline{)9.25} = 37$$
75
175
175
000

Change the following decimal numbers to per cents.

(55) .04 = (56) .025 = (57) 1.2 =

ANSWER COLUMN

58 Write 6% as a decimal. — 58 ____

59 Write $\frac{1}{2}$% as a decimal. — 59 ____

60 Write 105% as a decimal. — 60 ____

61 Change $\frac{1}{3}$ to per cent. — 61 ____ %

62 Change 40% to a common fraction. — 62 ____

63 How much is 2% of $3.50? — 63 $ ____

64 How much is $12\frac{1}{2}$% of $160? — 64 $ ____

65 How much is 150% of $50? — 65 $ ____

66 $5 is what per cent of $50? — 66 ____ %

67 What per cent of $100 is $300? — 67 ____ %

68 Harry Jackson loaned $500 to James Smith for six months. He charged Mr. Smith interest at the rate of 6% per year. How much was the interest on the loan? — 68 $ ____

MATHEMATICS PRE-TEST/POST-TEST

50 POSSIBLE

NAME_____

1. Divide 65' x 24" _____

2. Multiply 13.65 x 12 _____

3. Change 12.65 to 12 $\frac{\quad}{8}$ "

4. Divide 912" x 16" _____

5. Divide 57' by 4/3" _____

6-7. Change the following measurements to fractions that can be read on a steel tape

6. 17.44" = 17 _____"

7. 12.65" = 12 _____"

8. Find the length of a common rafter for a house with a 4 in 12 pitch and a span of 16' if the roof has a 2' overhang. _____

9. How many board feet of lumber is there in 5 - 2" x 4" x 12' long. _____

10. Find area in square feet of a rectangle with dimensions 48' x 26' _____

11. Find the area of a triangle with a base of 24' and an altitude of 16'.

_____

12. Find the area of a parallelogram with a base of 24' and an altitude of $12\frac{6}{}$.

_____

13. Find the area of a trapezoid with bases of 20' and 30' and an altitude of 10'. _____

14. Find the number of lineal feet in the following lumber order.

5 - 2"x4"x10'
3 - 2x6x8'
4 - 2x12x16' _____

15. 8 1/16 + 7 1/2 + 15 + 9 1/4 = _____

16. 12.006 — 9.7542 = _____

17. 49 1/16 — 25 1/2 = _____

18. 30% of $545 = _____

19. 32 is what % of 128? _____

20. 88 5/8" = _____ ft. _____ inches

21. The price of a new truck is $4500. If Mr. Fischer made a down payment of 20% of the price of the car, how much money did he pay down? _____

22. 7' - 3" ÷ 3 = _____

23. If a roof requires 2350 sq. ft. of plywood to cover it, how many square of shingles will it take to cover the roof? _____

24. 5 5/8 + 3 3/4 + 26 1/8 + 17 1/2 = _____

25. 83 1/8 — 65 3/4 = _____

26. 29% of 1040 = _____

27. 2 x 1 5/8" = _____

28. 39 x $5.09 = _____

29-30. How many feet of gutter are needed for a rectangular house 26 x 60$\frac{6}{}$ if it has a gable roof? A hip roof?

29. gable = _____

30. hip = _____

31. 30% of _____ is 27.

32. 16 2/3 x 3/5 = _____

33. Subtract fifty-eight thousandths from four hundred thirty-seven thousandths.
_____

34. 8 13/16 + 2 3/8 + 1 3/4 + 6 1/2 - 7/16 = _____

35. How many board feet in 54 10' 2" x 6"? _____

36. If a storage box is 9' long, 9'wide and 7' high, find the number of cubic yards of storage in this box. _____

37. 35% of 60 = _____

38. Divide 8'6 by 6 = _____

39. Change 15'3" to inches _____

40. Contractor's price is retail price less 15%. What is the contractor's price on a skil saw that retails for $89.00 _____

41-44. If lumber retails at $135 per thousand board feet, find the cost of the following lumber order.

41. 6 2" x 6" x 10' = _____

42. 12 2" x 12" x 16' = _____

43. 9 2" x 4" x 14' = _____

44. Total _____

45. What is the wall area of a room 15' x 14' if it has 8' ceilings. (Disregard windows & doors) How many 4'x8' sheets of gypsum wall board would it take to cover the walls?

45. wall area = _____

46. number of sheets = _____

47. Find the cost of 3,450 bd. ft. at $135.00 per thousand. _____

48. 20 1/4 ÷ 4 1/2 = _____

49. If this class is taught 4 hours per day for 1 school year, how many hours does each student have to finish his work? _____

50. Each student in the T.I.P. will use 6 bundles of 2"x4" material and 8 bundles of 2"x6" material. If each bundle of 2"x4" contain 63 sticks and costs $.04 per stick and each bundle of 2"x6" material contains 31 sticks and costs $.08 per stick, what will be the cost per student? _____

COMMUNICATIONS PRE-TEST/POST-TEST

Test #1

THE FOLLOWING ARE 50 TERMS THAT ARE FREQUENTLY USED IN THE COURSE AND CONSTRUCTION WORK OF THIS PROGRAM. YOU ARE TO SPELL THEM AS ACCURATELY AS YOU CAN.

1. Ridge Board
2. Fascia
3. Cornice
4. Asphalt Shingles
5. Pitch
6. Purlin
7. Gutter
8. Soffit
9. Ledger
10. Downspout
11. Aluminum
12. Ventilators
13. Frieze Board
14. Laminated
15. Panels
16. Vinyl
17. Eave
18. Galvanized
19. Veneer
20. Channel
21. Sheathing
22. Exposure
23. Coverage
24. Mineral
25. Flashing
26. Pneumatic
27. Underlayment
28. Straightedge
29. Wedge
30. Casement
31. Threshold
32. Vertical
33. Horizontal
34. Interior
35. Exterior
36. Weather
37. Preservative
38. Primer
39. Textured
40. Reflective
41. Radiation
42. Visqueen
43. Gypsum
44. Prefabricated
45. Ceramic
46. Miter
47. Enamel
48. Lacquer
49. Sealer
50. Latex

COMMUNICATIONS PRE-TEST/POST-TEST

TEST #2 NAME_____

THE FOLLOWING ARE 25 WORDS OR TERMS THAT ARE FREQUENTLY USED IN THIS COURSE. YOU ARE TO DEFINE EACH TERM AS ACCURATELY AS YOU CAN.

1. Fascia Board
2. Pitch
3. Gutter
4. Cornice
5. Downspout
6. Laminated
7. Eave
8. Veneer
9. Sheathing
10. Primer
11. Ventilator
12. Conductive
13. Flashing
14. Reflective
15. Exterior
16. Horizontal
17. Level
18. Preservative
19. Interior
20. Pneumatic Nailer
21. Vertical
22. Reflective
23. Visqueen
24. Miter
25. Latex Paint

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Evaluation: Off-Campus Work Experience
(T.I.P. Instructors)

Student Name_____ Date_____

Title of Establishment_____ Address_____

Date of Placement_____ Hours: From_____ To_____

Duties Performed_____

_____

_____

5 through 1: Degree of performance, ranging from the highest level of achievement to the lowest level of achievement.

	5	4	3	2	1
1. Acceptance of responsibility					
2. Shows initiative					
3. Indicates interest					
4. Follows instructions					
5. Attitude					
6. Cooperation and teamwork					

Observation of:

1. Work skills:_____

_____

2. Communication skills:_____

_____

3. Mathematics skills:_____

_____

4. Social Studies skills:_____

_____

Instructor:_____

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Classroom Evaluation: Independent Student Responsibilities
(T.I.P. Instructors)

Student Name_____ Date_____

Degree of responsibility for:

1. Regular assignments
2. Independent work (unsupervised)
3. Thoroughness in assignments
4. Self-initiated responsibility
5. Cooperation & teamwork

5	4	3	2	1

DEFINITION OF TERMINOLOGY:

Regular Assignment is defined as that work which is required of each student by a member of the Interdisciplinary faculty to achieve the stated objectives of the curriculum.

Independent Work (Unsupervised) is defined as that work carried on by a temporarily unsupervised student in an area of study which is supplemental to the regular assignments of the Interdisciplinary Program.

Thoroughness in Assignments is defined as the activity a student does to complete an assignment and reflects the extent of his effort and ability.

Self-Initiated Responsibility is defined as that effort initiated by the student because of interest and desire to realize a particular objective and was not begun because of faculty insistence.

Cooperation and Teamwork is defined as the activity exhibited by the student to work with his fellow students in a cooperative manner so that as individuals and a group they achieve the stated objectives of the Interdisciplinary Program.

5 through 1: Degree of performance, ranging from the highest level of achievement to the lowest level of achievement.

40

Instructor:_____

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Evaluation: Off-Campus Supervised Work Experience
(Cooperating Agent)

Student Name_____ Date_____

by Mr. or Mrs._____ Address_____

Title of Establishment_____ Phone_____

Date of Placement_____ Hours: From_____ To _____

Duties Performed_____

_____

_____

Please check on a five point scale showing student's progress in areas noted below: (No. 5 would be excellent and No. 1 would be poor.)

	5	4	3	2	1
1. Prompt and regular attendance					
2. Courteous and cooperative					
3. Tries to follow directions					
4. Uses time well					
5. Accepts responsibility					
6. Reaching productive stage					
7. Shows interest in assignment					
8. Shows initiative					

General statement about student's general progress:_____

_____

_____

_____

Cooperating Agent_____

41

School Representative_____

FIRST YEAR

UNIT WORK

SPECIFIC TEXTBOOK USAGE

The primary textbook:

Wagner, Willis H. Modern Carpentry. South Holland, Illinois; the Goodheart-Willcox Co., Inc., 1969.

Note: Hereafter when the students are instructed to read a specific unit in the textbook the reference is to the primary textbook.

The supplementary textbooks:

Feiler, John L. Woodworking for Industry. Peoria, Illinois: Chas. A Bennett Co., Inc., 1963.

International Conference of Building Officials. Uniform Building Code, 1967 Edition, Volume I. Pasadena, California, 1967.

U. S. Department of Housing and Urban Development, Federal Housing Administration, FHA Minimum Property Standards. Washington, D. C.: United States Government printing office, 1965.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

MATHEMATICS
INDIVIDUALLY PRESCRIBED UNITS

UNIT 1: WHOLE NUMBERS

OBJECTIVES: Upon completion of this unit the student will have demonstrated the ability to:

A. Read and write numerals to billions

B. Determine which of two whole numbers is larger or smaller

C. Add, subtract, multiply and divide whole numbers

D. Apply the above objectives to "word problems"

METHOD: The student will be given a teacher-made pre-test covering the stated objectives. If he passes the pre-test with a score of 95% or better, he will move into the next unit. If he fails to achieve 95% on the pre-test, the teacher will prescribe a list of assignments to meet his particular weaknesses. When the student has completed and checked the assignments in his prescription, he will take a teacher-made post-test covering the unit objectives. He must score 80% or better in order to continue to the next unit. If he fails to achieve at this level, a new prescription will be written and upon completion a second post-test will be given. If he again falls below 80%, a third prescription is given and upon completion a third post-test for which 70% accuracy is required.

RESOURCES:
1. Holt General Mathematics - Kinney, Ruble, Blythe; Holt, Rinehart & Winston, Inc., 1960.

2. Trouble Shooting Mathematics Skills - Bernstein and Wells; Holt, Rinehart & Winston, Inc., 1963.

3. Practice Problems in Mathematics - Carpentry Trades; Delmar Publishers, Inc., 1962.

100 Multiplication Facts

10 x 4 = ____	7 x 3 = ____	5 x 10 = ____	5 x 5 = ____	3 x 2 = ____
9 x 5 = ____	4 x 6 = ____	6 x 9 = ____	10 x 0 = ____	5 x 0 = ____
2 x 3 = ____	9 x 0 = ____	10 x 2 = ____	7 x 8 = ____	4 x 1 = ____
2 x 0 = ____	8 x 6 = ____	6 x 4 = ____	8 x 2 = ____	3 x 7 = ____
10 x 10 = ____	8 x 1 = ____	5 x 9 = ____	3 x 6 = ____	9 x 4 = ____
6 x 8 = ____	10 x 9 = ____	8 x 5 = ____	4 x 10 = ____	2 x 7 = ____
10 x 3 = ____	7 x 7 = ____	5 x 4 = ____	4 x 0 = ____	3 x 1 = ____
7 x 2 = ____	6 x 3 = ____	8 x 10 = ____	4 x 5 = ____	2 x 2 = ____
8 x 9 = ____	5 x 8 = ____	3 x 10 = ____	10 x 8 = ____	7 x 6 = ____
4 x 4 = ____	2 x 1 = ____	9 x 3 = ____	6 x 2 = ____	3 x 5 = ____
9 x 10 = ____	9 x 8 = ____	7 x 1 = ____	5 x 3 = ____	3 x 0 = ____
9 x 9 = ____	8 x 0 = ____	6 x 7 = ____	4 x 9 = ____	2 x 6 = ____
9 x 7 = ____	10 x 6 = ____	7 x 10 = ____	10 x 5 = ____	8 x 7 = ____
6 x 5 = ____	3 x 8 = ____	3 x 9 = ____	2 x 0 = ____	2 x 10 = ____
5 x 6 = ____	7 x 5 = ____	7 x 9 = ____	2 x 4 = ____	6 x 1 = ____
5 x 1 = ____	7 x 0 = ____	6 x 6 = ____	7 x 4 = ____	3 x 3 = ____
4 x 3 = ____	3 x 4 = ____	4 x 7 = ____	8 x 4 = ____	10 x 7 = ____
8 x 3 = ____	6 x 10 = ____	2 x 9 = ____	4 x 8 = ____	2 x 5 = ____
2 x 5 = ____	10 x 1 = ____	8 x 8 = ____	9 x 6 = ____	6 x 0 = ____
5 x 2 = ____	9 x 2 = ____	9 x 1 = ____	4 x 2 = ____	5 x 7 = ____

100 Division Facts

20 ÷ 10 = ___	0 ÷ 3 = ___	16 ÷ 8 = ___	42 ÷ 6 = ___	18 ÷ 2 = ___
35 ÷ 5 = ___	3 ÷ 3 = ___	21 ÷ 7 = ___	12 ÷ 2 = ___	50 ÷ 10 = ___
36 ÷ 9 = ___	18 ÷ 6 = ___	28 ÷ 4 = ___	54 ÷ 6 = ___	72 ÷ 8 = ___
15 ÷ 3 = ___	50 ÷ = ___	45 ÷ 5 = ___	9 ÷ 3 = ___	64 ÷ 8 = ___
40 ÷ 4 = ___	80 ÷ 10 = ___	14 ÷ 7 = ___	24 ÷ 8 = ___	32 ÷ 8 = ___
90 ÷ 10 = ___	24 ÷ 4 = ___	6 ÷ 6 = ___	27 ÷ 3 = ___	21 ÷ 3 = ___
20 ÷ 2 = ___	24 ÷ 6 = ___	30 ÷ 3 = ___	56 ÷ 8 = ___	36 ÷ 6 = ___
8 ÷ 2 = ___	10 ÷ 10 = ___	32 ÷ 4 = ___	40 ÷ 10 = ___	27 ÷ 9 = ___
2 ÷ 2 = ___	0 ÷ 4 = ___	30 ÷ 5 = ___	60 ÷ 6 = ___	49 ÷ 7 = ___
21 ÷ 3 = ___	72 ÷ 9 = ___	0 ÷ 9 = ___	8 ÷ 8 = ___	40 ÷ 8 = ___
48 ÷ 6 = ___	48 ÷ 8 = ___	70 ÷ 7 = ___	6 ÷ 3 = ___	15 ÷ 5 = ___
0 ÷ 5 = ___	100 ÷ 5= ___	20 ÷ 4 = ___	63 ÷ 9 = ___	0 ÷ 10 = ___
4 ÷ 4 = ___	60 ÷ 10 = ___	4 ÷ 2= ___	20 ÷ 5 = ___	28 ÷ 7 = ___
63 ÷ 7 = ___	25 ÷ 5 = ___	12 ÷ 3 = ___	18 ÷ 3 = ___	14 ÷ 2 = ___
80 ÷ 8 = ___	40 ÷ 5 = ___	10 ÷ 2 = ___	45 ÷ 9 = ___	0 ÷ 0 = ___
7 ÷ 7 = ___	70 ÷ 10 = ___	18 ÷ 9 = ___	16 ÷ 2 = ___	42 ÷ 7 = ___
0 ÷ 8 = ___	56 ÷ 7 = ___	10 ÷ 5 = ___	90 ÷ 9 = ___	56 ÷ 8 = ___
30 ÷ 10 = ___	24 ÷ 3 = ___	9 ÷ 9 = ___	0 ÷ 2 = ___	12 ÷ 6 = ___
81 ÷ 9 = ___	0 ÷ 7 = ___	8 ÷ 4 = ___	16 ÷ 4 = ___	6 ÷ 2 = ___
5 = ___	30 ÷ 6 = ___	36 ÷ 4 = ___	35 ÷ 7 = ___	54 ÷ 9 = ___

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

MATHEMATICS

NAME_____

UNIT 1: Whole Numbers - Pre-Test

1. Write the numeral for three million, two hundred twenty-four thousand, six hundred five. _____

2. Give the place value for each of the digits in the numeral 67,403,128.

the 6 stands for 6 x _____ the 3 stands for 3 x _____

the 7 stands for 7 x _____ the 1 stands for 1 x _____

the 4 stands for 4 x _____ the 2 stands for 2 x _____

the 0 stands for 0 x _____ the 8 stands for 8 x _____

3. Add:

75	809	726 + 50 + 9 + 869 = _____
49	43	
86	511	
70	796	

4. Subtract:

82	987	93	791	405
- 51	- 505	- 79	- 219	- 338

5. Multiply:

63	359	402	620
x 27	x 83	x 70	x 509

6. Divide:

$8\overline{)1{,}744}$ $24\overline{)5{,}616}$ 2,961 ÷ 63 = 50,256 ÷ 48 =

7. The following bill of materials contains how many board feet of lumber?

540 studs, 6 bd. ft. each

14 girders, 22 bd. ft. each

16 beams, 46 bd. ft. each

8. A carpenter has 1,600 square feet of shingles to lay. He puts down 348 sq. ft. the first day, 430 sq. ft. the second day, and 368 sq. ft. the third day. How many square feet has he left to put down?

UNIT 1: Whole Numbers

Assignments

Texts: (1) Holt General Mathematics
(2) Practical Problems in Mathematics - Carpentry Trades
(3) Trouble-Shooting Mathematics Skills

Concept		
Problem Solving	1.	(1) Study pages 4-5
Place Value	2.	(1) Read pages 7-8 Do #1-12, pages 8-9
Rounding Off	3.	(1) Do problems 1-7, page 25
Addition Combinations	4.	(3) Read pages 1-4 Do Practice Set 1, 2, 3, pages 5-6
Addition Problems	5.	(1) Do Section A 1-6, page 13
Subtraction Combinations	6.	(3) Read pages 8-9 Do Practice Set 7, 8, 9, pages 9-10
Subtraction Problems	7.	(1) Do Section D 1-8, page 14
Multiplication Combinations	8.	(3) Read pages 11-15 Do Practice Set 13, 14, pages 14-15
Multiplication Problems	9.	(1) Do Section A and B, page 39
Division Facts	10.	(3) Read pages 15-16 Do Practice Sets 15, 17, pages 16-17
Division Problems	11.	(1) Do problems 11-15, page 49
Word Problems	12.	(2) Review Assignment 1 Do problems 16, 17, 20, 21, page 2 Do problems 13, 14, 20, 21, 25, page 6 Do problems 16, 25, 26, 33, pages 9-10 Do problems 10, 11, 12, 14, 16, pages 11-12
	13.	Test

MATHEMATICS

UNIT 1

NAME:_____

Assignment	1	2	3	4	5	6	7	8	9	10	11	12	Test
Number of Problems	1	12	26	60	6	60	8	22	6	40	5	18	
Number Correct													
Date Finished													

MATHEMATICS

NAME:_____

UNIT 1: Whole Numbers - Post Test 1

1. Write the numeral for one million, seven hundred thirty-six thousand, fifty-five. _____

2. Give the place value for each digit in the numeral 560,432.

5_____ 4_____

6_____ 3_____

0_____ 2_____

3. 94 + 78 + 453 + 70 =

4. 539 + 74 + 107 + 89 =

5. 24,305 - 15,283 =

6. 17,500 - 11,801 =

7. 359 x 83 =

8. 620 x 509 =

9. 5,616 ÷ 24 =

10. 1,935 ÷ 45 =

11. 2,996 ÷ 28 =

12. George works at a gas station three hours each day after school and five hours on Saturday. What is his weekly pay if he earns $1.95 an hour?

13. If each 2" x 6" rafter 16 feet long contains 16 bd. ft., how many board feet are there in 48 rafters?

14. The following scores were made on a math test by five students: 84, 76, 93, 87, 85. What was the average score of these five students?

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

UNIT ONE: Hand and Power Tools

OBJECTIVE: Upon completion of this unit each student will have knowledge of the uses and safety of the hand and power tools used in the building trades.

RESOURCE MATERIALS:

1. Textbook (Units 1 and 2)
2. Classroom Resource Materials
3. Resource Center
4. Franklin Pierce High School Woodshop

STUDENT RESPONSIBILITY:

A. 1. Read and study text units.

2. Familiarize yourself with all hand and power tools located in the classroom.

3. Preview available film loops.

4. Complete Unit 1, Communications Terminology. Submit for grading. Be prepared for testing.

B. In a written report do the following:

1. Discuss the uses and safety of the following groups of hand tools:

   a. Measuring and layout tools

   b. Cutting tools

   c. Planing, smoothing and shaping tools

   d. Tools used for fastening

2. Discuss the uses of the following portable power tools. Include 6 major safety rules for each.

   a. Portable circular saw

   b. Saber saw

   c. Portable electric drill

d. Portable router

e. Portable sanders

f. Power staplers and nailers

3. Discuss the uses of the following stationary power tools. Include 9 major safety rules for each.

a. Radial arm saw

b. Table saw

c. Jointer

4. Upon completion, submit for grading.

Unit One: Communications Terminology

NAME_____

____ T-BEVEL
____ ALUMINUM LEVEL
____ SABER SAW
____ CROSSCUTTING
____ TRANSIT
____ AUTOMATIC SCREWDRIVER
____ JOINTER
____ MITER BOX
____ RIPPING
____ ROUTER
____ CLAW HAMMER
____ ORBITAL SANDER
____ SKIL SAW
____ CAULKING
____ PLUMB BOB
____ PORTABLE ELECTRIC DRILL
____ RADIAL ARM
____ STAPLER
____ CARPENTER'S SQUARE
____ CHISEL

1. Sawing with the grain of the wood
2. Sawing across the grain of the wood.
3. A machine that squares the edges of boards
4. A saw which has the motor and blade carried on an overhead arm.
5. A power-driven sanding machine that rotates the sandpaper in a horizontal circle.
6. A steel layout tool cut at right angles, measuring 24" on one arm and 16" on the other arm; it has measured scale on all edges.
7. A telescopic instrument that is used for sighting levelness and straightness
8. A saw and metal box that aids in cutting miters and joints.
9. The procedure of inserting waterproof material in cracks and joints
10. A devise that drives metal staples through a material to attach it to another material.
11. A leveling instrument used to check and layout vertical and horizontal lines
12. A pointed weight attached to a string that when hung suspended determines true vertical lines
13. A tool that has a handle attached to a sharp blade and is used to trim away stock.
14. A pounding instrument that has two claws on one side for pulling nails from wood.
15. A portable electric saw with a circular blade that is used for sawing boards or panels.
16. A portable electric saw that is used for small detailed work
17. A drill supplied with various sized bits that are used for drilling holes in wood.
18. A power-driven machine with a bit that is used to cut irregular shapes, contours, and edges.

19. A screwdriver that rotates automatically when pressure is applied to the handle end.

20. A tool that is used to pick up and transfer various angles.

UNIT 2: FRACTIONAL NUMBERS

OBJECTIVES: Upon completion of this unit the student will have demonstrated the ability to:

A. Read and write fractional numerals

B. Determine which of two fractional numbers is larger or smaller

C. Change fractions to equivalent fractions with larger or smaller denominators

D. Add, subtract, multiply and divide fractional numbers

E. Apply the above objectives to "word problems"

METHOD: The student will be given a teacher-made pre-test covering the stated objectives. If he passes the pre-test with a score of 95% or better, he will move into the next unit. If he fails to achieve 95% on the pre-test, the teacher will prescribe a list of assignments to meet his particular weaknesses. When the student has completed and checked the assignments in his prescription, he will take a teacher-made post-test covering the unit objectives. He must score 80% or better in order to continue to the next unit. If he fails to achieve at this level, a new prescription will be written and upon completion a second post-test will be given. If he again falls below 80%, a third prescription is given and upon completion a third post-test for which 70% accuracy is required.

RESOURCES: 1. Vocational and Technical Mathematics in Action - Samuel Levine; Heyden Book Company, 1969.

2. Holt General Mathematics - Kinney, Ruble, Blythe; Holt, Rinehart & Winston, Inc., 1960.

MATHEMATICS

NAME: _____

UNIT 2: Fractions - Pre-Test

1. Using numerals write each of the following:

   a) five-sixteenths

   b) three and three-eighths

   c) five feet six and one-fourth inches

2. Reduce each to lowest terms

   a) 6/16 = _____ b) 8/32 = _____ c) 4/8 = _____

3. In each pair, determine which is larger:

   a) 5/8 or 7/8 b) 5/16 or 1/4 c) 12/32 or 3/8 d) 3 5/8 or 3 11/16

4. Do the indicated operation - reduce answers to lowest terms.

   a) 3/4 + 1/4 + 3/4 =

   b) 3/4 + 1/2 + 7/8 =

   c) 2 1/4 + 3 5/8 + 3/4 + 3 1/4 =

   d) 1 5/8 + 1 5/8 =

   e) 13/16 - 7/16 =

   f) 2 1/4 - 7/8 =

   g) 16 - 12 5/8 =

   h) 5/8 x 2/16 =

   i) 4 x 2 3/8 =

   j) 1 3/8 x 3 =

   k) 1 7/8 x 2 3/4 =

   l) 3' 4 5/8" x 12 =

   m) 3 5/8 ÷ 3/4 =

   n) 25' 8¼" ÷ 6 =

5. A carpenter was given 16 hours to do a particular job. He worked on the job 5 different times as shown: 1/2 hour, 1 1/2 hours, 7 3/4 hours, 1 1/4 hours, and 3/4 hour. How long does he have to finish the job?

6. Joe works 1 1/4 hours each day after school and 4 1/2 hours on Saturday cleaning a small store. If he earns $1.60 an hour, what is his weekly salary?

7. A carpenter needed the following lengths of 2" x 4" for backing: 15 3/4", 15 5/8", 32 1/2", and 18 5/16". Allowing 1/16" for each san cut, can he cut all the pieces from an 8' 2 x 4? If "yes", how much is left over or, if "no", how much longer than 8' would the 2 x 4 have to be?

NAME:_____

UNIT 2: Fractions

Assignments

Texts: (1) Vocational and Technical Mathematics in Action
(2) General Mathematics

Concept

Exact & Approximate Numbers	1. (1) Read page 1-2 Do problems 3-7, 10, page 3
Reducing	2. (1) Read page 4-5 Do problems 1-16, page 5
Reading a Ruler	3. (1) Read pages 5-6 Do problems 1-7, pages 6-7
Comparing	4. (2) Page 119, do 3-8 Read page 120
Equivalent Fractions	5. (2) Page 122, section A 1-12, section B 1-16
Common Denominator	6. (1) Read pages 8-10 Do problems 1-4, page 10
Addition	7. (1) Read pages 10-11 Do problems 1-19, pages 11-12
Addition	8. (1) Do problems 1, 2, 5, 6, page 12
Subtraction	9. (1) Read pages 12-15 Do problems 1, 3, 5, 7, 9, 11, 13-19, page 16
Multiplication	10. (2) Page 134 000 Problems 1-17
Multiplication	11. (2) Page 135 Section B Page 136 Section C #2, 4, 9, 14 Page 136 Section D #1, 4, 7, 10
Multiplication	12. (1) Page 21-22 Do problems 3, 4, 7, 10, 11
Division	13. (1) Read pages 22-24 Do 000 exercises, page 25
Measurement	14. (1) Read pages 26-28 Do exercises 1, 3, 5, 7, page 27 Do exercises 1-5, page 28 Do problems 1-3, page 28
Measurement	15. (1) Study multiplication and division, page 28-29 Do exercises 1, 5, 10, 12, page 30 Do problems 1, 2, page 30
	16. Test -55-

MATHEMATICS

Unit 2: Fractions

NAME:_____

Assignment Number	1	2	3	4	5	6	7	8	9	10	11	12	13	Test
Number of Answers	29	36	10	15	26	18	8	11	5	3	14	11	28	
Number Correct														
Date Finished														

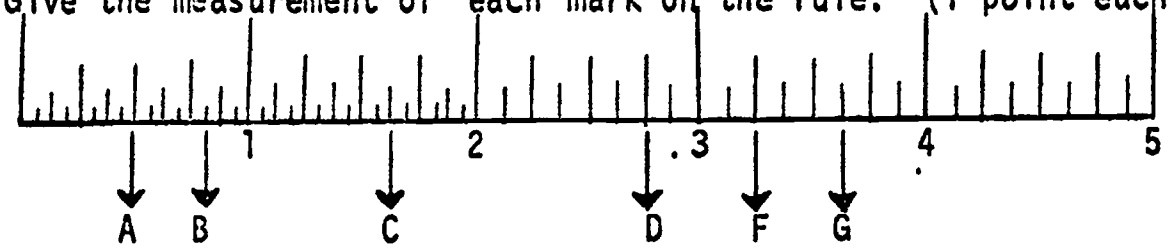
T. I. P.

MATHEMATICS

NAME: _____

UNIT 2: FRACTIONS
POST-TEST 1

1. Give the measurement of each mark on the rule. (1 point each)



_____ _____ _____ _____ _____ _____

2. Change to lowest terms. (2 points each)

a) 2/16 = _____ b) 6/8 = _____ c) 4/32 = _____

3. Do the indicated operation - reduce answers to lowest terms. (3 points each)

a) 3/16 + 1/4 = _____ b) 3/4 + 5/8 + 3/16 = _____

c) 1½ + 2 5/8 + 4 7/16 + 3¼ = _____ d) 3 7/8 - 2 1/8 = _____

e) 6 - 3 5/8 = _____ f) 10½ - 7 9/16 = _____

g) 3 x 3 5/8 = _____ h) 7 x 3/4 = _____ i) 4½ x 2 3/4 = _____

j) 9/16 ÷ 3 = _____ k) 7½ ÷ ½ = _____ l) 4 1/16 ÷ 3 3/4 = _____

POST-TEST 1 continued

SHOW YOUR WORK

4. Ten inch wide siding will cover 9 1/8 inches. How many boards will be required to side a wall that is 12'2" high?

5. There are 14 risers in the stairs from the basement to the first floor of a house. Find the height of the basement if the risers are 7 1/8 inches high.

6. How much longer is a 12d nail than an 8d nail if the lengths are 3¼" and 2½" respectively?

7. A board is 13½" wide. The foreman on the job gave an apprentice carpenter the job of ripping off a 7/8" piece, a 1¼" piece, a 2 7/16" piece, and a 3 3/4" piece. How much remained of the original board if 1/16" was allowed for each cut?

T. I. P.

MATHEMATICS

UNIT 2: FRACTIONS
POST-TEST 2

NAME:_____

1. Reduce to lowest terms:

   a) 6/16 = _____ b) 8/32 = _____ c) 12/8 = _____

2. Do the indicated operation - reduce answers to lowest terms.

   a) 5/8 + 5/16 = _____ b) ½ + ¼ + 1/8 + 1/16 = _____

   c) 2 3/4 + 1 5/8 + 3/4 + 2 7/16 = _____

   d) 15/32 - 7/32 = _____ e) 3 3/4 - 1 7/8 = _____

   f) 7 - 4 3/16 = _____ g) 3/4 x 12/32 = _____

   h) 5 x 3 5/8 = _____ i) 16 x 3/8 = _____

   j) 5 3/4 x 1 1/8 = _____ k)) 16' 5½" ÷ 5 = _____

   l) 4 3/4 ÷ ½ = _____ m) 4 x 3' 5 3/4" = _____

POST-TEST 2 continued

3. If a carpenter has a board 13½ ft. long, how many pieces each 2'3" long can he cut from it, disregarding the waste caused by sawing?

4. mechanic needed 8 pieces of steel rod each 8¼" long. If this rod is sold by the foot, what is the least number of feet he would have to buy? If he allows 1/32" per cut for waste, how much material is left from the rod he bought?

5. An electrical contractor bought a reel of 1000' of wire. On one job he used 125½ feet and 118½ feet. On another job he used 174'8" and 256'10". How many feet of wire did he have left on the reel?

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MATHEMATICS

UNIT 2: FRACTIONS
POST-TEST 3

NAME: _____

1. a) ¼ + 7/8 + 3/16 = _____ b) 3/4 + ½ + 7/8 = _____

c) 2¼ + 3 5/8 + 3/4 + 3¼ = _____ d) 3/16 - 7/16 = _____

e) 2¼ - 7/8 = _____ f) 16 - 12 5/8 = _____

g) 5/8 x 2/16 = _____ h) 4 x 2 3/8 = _____

i) 1½ x 7 = _____ j) 1 7/8 x 2 3/4 = _____

k) 3' 4 5/8" x 12 = _____ l) 3 5/8 ÷ 3/4 = _____

m) 25' 8¼" ÷ 6 = _____

POST-TEST 3 continued

2. A repairman used lengths of copper tubing for oil lines as follows: 12 7/32", 14 9/64", 9 7/16", 4", 7 1/8", and 6 7/8". What was the total length of tubing used?

3. The front wheels of a car are not parallel but set to toe-in; that is, the front edges are closer together than the back. The toe-in measurements of a certain car was 3/8". The specifications called for a toe-in of 3/16". Should the toe-in be increased or decreased? How much?

4. A workman is allowed 14¼ hours to complete a certain job. He worked on the job 5 different times as are shown: 1/2 hour, 1½ hours, 7 3/4 hours, 1 1/4 hours, and 3/4 hour. How much time remains to complete the job?

5. Tom works 1¼ hours each day after school and 4½ hours on Saturday cleaning a small store. If he earns $1.60 an hour, what is his weekly salary?

6. Joe built a bookcase with three shelves each 3½" long. He also used 2 pieces of wood each 3 3/4 feet long and two side pieces each 4½ feet long. How many feet of wood did he use?

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UNIT TWO: Leveling Instruments

OBJECTIVE: Upon completion of this unit, each student will have the knowledge and skill to use the leveling instrument for foundation layouts.

RESOURCE MATERIALS:

1. Textbook (Unit 3)
2. Leveling Instrument

STUDENT RESPONSIBILITY:

A. Read and study text units.

B. Familiarize yourself with the leveling instruments available in class.

C. Discuss in written form the mechanics of setting up and leveling the instrument.

D. Demonstrate to the instructor's satisfaction your ability to set up and level the instrument.

E. Discuss in written form, using drawings where necessary, the leveling process. In laying out the four corners of a foundation, tell how you know from your readings whether there should be a cut or fill to reach a desired grade level.

F. Demonstrate to the instructor's satisfaction your ability to give instructions to the bulldozer operator for leveling a particular piece of ground for the foundation.

G. Discuss in written form, using drawings where necessary, the method used in laying out a right angle with the leveling instrument.

H. Demonstrate to the instructor's satisfaction your ability to lay out the four corners of a 16' x 24' garage using the leveling instrument. The garage is set back from the sidewalk 6'0".

I. Upon completion, submit for grading.

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UNIT TWO: Selecting an Adequate Building Site

OBJECTIVE: Upon completion of this unit each student will be able to evaluate a prospective building site and determine its adequacy for construction.

RESOURCE MATERIALS:

1. Mineographed information:

   a. Fourteen factors
   b. Detailed questions
   c. Communications terminology
   d. Evaluation charts

STUDENT RESPONSIBILITY:

A. 1. Study and understand 14 factors.

B. 1. Understand and be able to define terminology.

C. 1. Evaluate a site near the school:

   a. Complete evaluation chart; submit for grading.

   2. Evaluate a site that is for sale:

      a. Complete evaluation chart; submit for grading.

   3. Evaluate a site that is not for sale but may be purchased:

      a. Complete evaluation chart; submit for grading.

D. 1. Be prepared for testing:

   a. Communications terminology

14 FACTORS TO CONSIDER WHEN SELECTING A BUILDING SITE

1. The neighborhood
2. Adjacent lots
3. Topsoil (quality and drainage)
4. Neighbors
5. Transportation
6. Churches, schools, and shopping centers
7. Sewers, septic tanks, types of streets, gas mains, powerlines
8. Zoning
9. Deed restrictions
10. Traffic
11. Site shape (size)
12. Site layout
13. Site cost (14% of total cost)
14. Financing agent

FACTORS TO CONSIDER WHEN SELECTING A BUILDING SITE

(Before you try to find answers to the following: The many questions under each of the 14 factors are included as guidelines. To find a site which would satisfy every question should be considered all but impossible. When evaluating a site, the builder or prospective owner should try to find answers for as many as possible. Even then there may be personal preferences which would rule out certain questions and their answers.)

1. The neighborhood:

   a. What are the ages and styles of the houses already there?
   b. What is the age and condition of the streets, sidewalks, lighting, and sewers?
   c. Is it a deteriorating neighborhood?
      1. Are there visible piles of trash and throwaways?
      2. Are there unrepaired and unpainted houses and fences?
      3. Are there poorly maintained yards?
   d. Does it appear to be an up-to-date, progressive young neighborhood?
   e. Does the closeness of shopping centers, schools, public and commercial industries affect traffic, peace-and quiet?

2. Adjacent lots:

   a. What is the kind, age, heighth, and condition of nearby houses?
   b. If adjacent lots are not occupied:
      1. Are they dumping ground for refuse?
      2. Are they brushy?
      3. Are they swampy?
      4. Are they play areas for children?

3. Topsoil:

   a. Is there good drainage year around?
   b. What is the depth of the water-table during rainy seasons?
   c. What is the depth and quality of the topsoil?
   d. Is the site leveled with fill dirt?

4. Neighbors:

   a. What is the approximate age of the adults?
   b. Are there many children and pets?
   c. Are there visible outside signs of the social status of the neighbors?
   d. Is the neighborhood integrated or segregated?
   e. What are the possible social relationships?

5. Transportation:

   a. Are bus services available, close by, nonexistent?
   b. Is the site easy to drive to?
   c. Is the site difficult to get onto in the winter?
   d. What is the amount of traffic, and what are the speed limits on nearby streets?
   e. Does the local government have plans for improvement or development of the neighborhood streets?

6. Churches, schools, and shopping centers:

   a. Are churches of personal faith nearby?
   b. Are elementary schools within easy walking distance for children?
   c. Are junior high schools within reasonable distance?
   d. Are high schools within reasonable distance?
   e. Are shopping centers within walking distance for young children?
   f. Are other commercial services available?
   g. Are (or will) property taxes affected by closeness of shopping centers?
   h. Is the local government planning on nearby commercial development?

7. Sewers, septic tanks, types of streets, curbs, gas mains, powerlines:

   a. How long has it been since these facilities were installed?
   b. Can they be expected to be installed in the near future with subsequent rising of taxes?
   c. Will purchase of the site require special sewer services?
   d. Is septic tank installation prohibited or restricted?

8. Zoning:

   a. Is it a permanently zoned residential area?
   b. Are there options in existence that may open the neighborhood up for commercial development?

9. Deed restrictions:

   a. Are there restrictions, liens, unknown factors that should be investigated by legal officers, surveyors, assessors?

10. Traffic:

    a. (Refer to Transportation, Schools, Shopping Centers)

11. Site shape:

    a. Can this determine the architecture of the house?
    b. Will there be adequate "open space" after construction?

12. Site layout:

    a. Does the site have varied elevations, slopes, streams, drop-offs?

13. Site cost:

    a. Is there an official assessed valuation of the site?
    b. Are there any hidden costs? (Refer to #7 and #9 above)

14. Financing agents:

    a. Have they seen the site?
    b. Have they provided counseling, advice?
    c. Is the firm reputable?

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Unit Two: Communications Terminology

The following terms are provided with definitions. You are expected to study them and be prepared for testing on the spelling of selected terms and definitions of selected terms.

1. building site: a site that is at least two lots, and a house can be built on it.

2. elevation: the grade level from the lowest point to the highest point of a building site.

3. neighborhood: the area surrounding the building site for approximately 1/4 mile in all directions.

4. adjacent lots: those lots directly in front, in back, and on both sides of a building site.

5. topsoil: the soil that is the top layer of soil on a building site before construction begins.

6. transportation: auto traffic on, to, from, and around the building site.

7. restrictions: limitations that are placed upon the use of a building site and the building upon it.

8. site shape: the boundry outline of a building site.

9. site layout: the various elevations, natural growth, and obstructions on a building site.

10. commercial zone: an area that is zoned by the local government for business purposes.

11. industry: manufacturing industries near a building site.

12. facilities: commercial and recreational services near a building site.

13. sewer line: underground pipes that carry sewage to a public disposal area.

14. residential zone: an area that is zoned by the local government for home building only.

15. lien: when a building site cannot be bought free and clear because money is owed and somebody charges it to the property.

16. surveyor: a representative of the local government who determines the correct boundry lines of a building site.

17. assessor: a representative of the local government who determines the true value of a building site.

18. financing: money borrowed to purchase a building site and materials to build a structure.

19. lot: an area measuring 25' x 120'.

20. open space: the space on a site, surrounding a structure that allows freedom of movement and is adequate for health and safety.

EVALUATION OF A HOME SITE

The purpose of this exercise is to put the theory of site selection to practical use. You are to evaluate the selected site. You are not to consider anything other than the factors listed below. Try not to let your personal preferences influence your analysis.

After each factor there are a series of boxes. Each box is identified as POOR, FAIR, GOOD. There is also a box for COMMENTS. Evaluate the site with each of the points listed below. Take into consideration the questions we dealt with to help you determine how you should mark each factor. If there is a particular reason for your mark, or if there is a factor not mentioned which affects the kind of mark given, make a written comment in the comment box. Mark your final decision at the bottom and sign your name.

FACTORS	POOR	FAIR	GOOD	COMMENTS
The neighborhood				
Adjacent lots				
Topsoil				
Neighbors				
Transportation				
Churches, schools, shopping centers				
Sewers, curbs, gas mains, powerlines				
Zoning				
Deed restrictions				
Traffic				
Site shape				
Site layout				

DECISION: Site approved for construction _____

Site not approved for construction _____

Signature _____

UNIT 3: RATIO AND PROPORTION

OBJECTIVES: Upon completion of this unit the student will have demonstrated the ability to:

A. Know what a ratio is.

B. Know what a proportion is.

C. Apply the use of proportions in solving "word problems".

METHOD: The student will be given a teacher-made pre-test covering the stated objectives. If he passes the pre-test with a score of 95% or better, he will move into the next unit. If he fails to achieve 95% on the pre-test, the teacher will prescribe a list of assignments to meet his particular weaknesses. When the student has completed and checked the assignments in his prescription, he will take a teacher-made post-test covering the unit objectives. He must score 80% or better in order to continue to the next unit. If he fails to achieve at this level, a new prescription will be written and upon completion a second post-test will be given. If he again falls below 80%, a third prescription is given and upon completion a third post-test for which 70% accuracy is required.

RESOURCES:
1. Vocational and Technical Mathematics in Action - Samuel Levine; Hayden Book Company, 1969.
2. Holt General Mathematics - Kinney, Ruble, Blythe; Holt, Rinehart & Winston, Inc., 1960.
3. Applied Mathematics - Franklin Pierce School District, 1968.

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MATHEMATICS

UNIT 3: Ratio and Proportion NAME:_____

PRE-TEST

1. Express each of the following as a ratio using fractions reduced to lowest terms.

   a) 1 ft. to 1 yd.

   b) 1 oz. to 1 lb.

   c) 3 in. to 1 ft.

   d) 4 oz. to 1 lb.

2. Joe is earning money to buy a new camera that costs $36. He has already earned $27. What fraction of the cost does he still have to earn?

3. A cement mixture calls for 6 bags of cement, 33 gallons of water and 1,050 pounds of sand.

   a) What is the ratio of water to cement?

   b) What is the ratio of sand to cement?

4. The ratio of 7 to 35 is the same as the ratio of 1 to _____.

5. An equation made up of two equal ratios is called a _____.

Set up the proportion for and solve each of these problems:

6. Thirty miles per hour is equal to 44 feet per second. Forty-five miles per hour is equal to how many feet per second?

7. Jim figured that he spent $281 on his car for 4,250 miles of driving. He expects to drive 10,000 miles in the next year. How much should he expect to spend?

8. The property taxes of a home valued at $17,500 are $255.50 per year. What is the tax rate for $1,000 of property value?

9. A 12" diameter pulley and a 5" diameter pulley are joined by a belt. If the 12" pulley is turning at 100 RPM, what will be the RPM of the 5" pulley?

10. It takes 6 men 4 days to do a particular job. If the job must be done in 3 days, how many men should be working on the job?

T. I. P.

MATHEMATICS

UNIT 3: Ratio and Proportion NAME:_____

Assignments

Texts: (1) Vocational and Technical Mathematics in Action
(2) Holt General Mathematics
(3) Applied Math

Concept

Meaning of Ratio	1.	(1) Read pages 181-183 Do problems 1-6; page 184
Applying Ratios	2.	(1) Read pages 184-185 Do problems 3, 4, 5, 10; pages 185-186
Scale Drawings	3.	(1) Read pages 186-188 Do problems 1, 3, 4, 7, 8, 9; pages 189-190
Scale Drawings	4.	(2) Do 1-17, 21, 22; page 379
Meaning of Proportion	5.	(1) Read pages 190-191 Do problems 1; page 191-192
Direct Proportion	6.	(1) Read pages 192-196 Do problems 1-7, 10; page 196-197
Direct Proportion	7.	(3) Do problems 2, 6, 10, 11; page 53 Do problems 4, 5, 8; page 54 Do problems 1, 3, 4, 7; page 57
Inverse Proportion	8.	(1) Read pages 197-201 Do problems 1-3, 5, 6, 8, 10; pages 201-202
Inverse Proportion	9.	(3) Do problems 1-10; page 59
	10.	Test

Assignment	1	2	3	4	5	6	7	8	9	Test
Number of problems	12	5	13	30	18	8	11	8	10	
Number Correct										
Date Finished					79					

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MATHEMATICS

UNIT 3: Ratio and Proportion NAME:_____

POST-TEST 1

1. Express each of the following as a ratio using fractions reduced to lowest terms.

   a) 1 hour to 20 min.

   b) 6 in. to 2 ft.

   c) ¼" to 1 ft.

   d) 12 oz. to 1 lb.

2. 385 miles in 7 hours is the same ratio as how many miles in one hour?

3. A 15' steel beam weighs 450 pounds. What is the ratio of pounds per foot?

4. The ratio of earnings of a plumber and his helper are 5 to 3. If the helper received $93 for his share on a certain job, how much did the plumber receive?

5. A 250' coil of electrical cable weighs 80 pounds. What will be the length of a portion of this coil weighing 30 pounds?

6. A pipe pours 201 gallons of water into a tank in 1½ hours. How long will it take to fill an empty tank with a capacity of 4,623 gallons?

7. It takes a plane whose speed is 250 mph 5 hours and 36 minutes to cover a certain distance. What is the speed of a plane that covers the same distance in 3 hours and 30 minutes?

Post-Test 1 continued

8. If 20 men can do a job in 45 days, how many days will it take 12 men to do the same job?

9. An electric motor with a 4" pulley that rotates at 1,500 rpm drives a mixer with a 18" pulley. What will be the rpm of the mixer?

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UNIT THREE: Reading and Understanding Construction Blueprints

OBJECTIVE: Upon completion of this unit each student will have knowledge of and experience in reading and understanding a variety of residential construction blueprints.

RESOURCE MATERIAL:

1. Textbook (Unit 5)
2. Classroom resource materials
3. Various sets of blueprints

STUDENT RESPONSIBILITY:

A. 1. Read and study text unit.

2. Become basically familiar with assigned set of blueprints.

3. Because of the lack of text materials covering blueprint reading, you will be given a series of lectures covering all parts of construction blueprints used in this area.

4. Each student will be required to complete the following outline and submit for grading:

I. Floor Plans

a. Using the proper architectural symbols and conventions, indicate the following:

1. Exterior wall:

2. Exterior window:

3. Interior wall:

4. Header:

5. Swinging door:

6. Sliding wardrobe door:

7. Shelf and pole:

8. Bi-fold door:

9. Sliding glass door:

10. Pocket door:

11. Overhead garage door:

12. Apron:

13. Vanity sink:

14. Bathtub:

15. Shower:

16. Toilet:

17. Fan:

18. Kitchen sink:

19. Dishwasher:

20. Range:

21. Refrigerator:

22. Lower kitchen cabinets:

23. Upper kitchen cabinets:

24. Furnace (gas or oil):

25. Hot water tank:

26. Washer:

27. Dryer:

28. Laundry tray:

29. Fireplace:

30. 110 duplex outlet:

31. Switch:

32. 220 outlet:

33. Waterproof duplex outlet:

34. TV outlet:

35. Telephone jack:

b. Bedroom:

1. Window & size:

2. Door & size:

3. Closet & door size:

4. Shelf & pole:

5. Switches:

6. Overhead lights:

7. Duplex outlets:

c. Bathroom:

1. Door & size:

2. Window & size:

3. Toilet:

4. Vanity sink:

5. Medicine cabinet:

6. Bathtub:

7. Shower:

8. Fan:

9. Closet (storage & linen):

10. Lights:

11. Switches:

12. Duplex outlets:

d. Hallway:

1. Width:

2. Closets (linen or wardrobe):

3. Overhead lights:

4. Switches:

5. Duplex outlets:

6. Door chimes:

7. Cold air return (oil or gas):

8. Thermostat:

e. Living Room:

1. Window and size:

2. Fireplace:

3. Entrance to living room:

4. Lights:

5. Switches:

6. Duplex outlets:

f. Fireplace:

1. Hearth:

2. Fireplace face (brick or stone):

3. Firebox size (30" x 36" x 18"):

4. Fireplace size (4' x 6'):

g. Dining Room:

1. Door & size:

2. Window & size:

3. Overhead lights:

4. Duplex outlets:

5. Switches:

h. Foyer:

1. Door & size:

2. Guest closet:

3. Shelf & pole:

4. Floor covering:

5. Overhead lights:

6. Switches:

7. Doorbell & transformer (where located):

i. Family Room:

1. Entrance:

2. Fireplace:

3. Overhead lights:

4. Switches:

5. Duplex outlets:

6. Window & size:

7. Sliding glass door & size:

8. Patio & size:

9. Storage closets:

j. Kitchen:

1. Lower cabinets:

2. Upper cabinets:

3. Pantry:

4. Sink (double):

5. Refrigerator:

6. Range:

7. Dishwasher:

8. Overhead lights:

9. Switches:

10. Duplex outlets:

11. 220 outlet:

12. Window (size):

13. Doors (size):

14. Telephone jack:

15. Fan:

k. Utility Room:

1. Cabinets:

2. Washer:

3. Dryer:

4. Door (size):

5. Window (size):

6. Broom closet:

7. Laundry tray:

8. Overhead lights:

9. 110 duplex outlet:

10. 220 outlet:

11. Switches:

1. Half Bath:

1. Sink (vanity or wall hung):

2. Medicine cabinet:

3. Toilet:

4. Linen closet:

5. Door (size):

6. Window (size):

7. Fan:

8. Overhead light:

9. Switch:

10. 110 duplex outlet:

m. Garage:

1. Door (overhead):

2. Window (size):

3. Door (entrance & exit):

4. Furnace (gas or oil):

5. Hot water tank:

6. Concrete floor:

7. Apron:

8. Storage:

9. Overhead lights:

10. Switch:

11. 110 duplex outlets:

12. 220 outlet:

n. Dimensions:

1. All pertinent dimensions will be included on the floor plan.

2. Three line dimensions indicated on outside of building line. These include:

a. Distance from center of windows and doors to center of windows and doors.

b. Distance from center of partition to center of partition.

c. Overall dimensions.

3. Room indication and size:

a. Length and width

o. Concrete Indicated:

1. Porches

2. Patios

3. Sidewalks

p. On F.H.A. drawn plans, scaled drawings of the following will appear:

1. Kitchen cabinets

2. Bathroom vanity

3. Typical wardrobe

4. Storage closets

5. Linen closet

6. Fireplace face

q. Sheet name and scale will always be indicated.

r. Upon completion of this portion of unit three, each student will be required to successfully pass a floor plan examination.

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Unit III: Floor Plans Examination Name_____

DIRECTIONS: Using the proper architectural symbols and conventions, indicate the following.

1. Exterior wall

2. Header

3. Swinging door

4. 110 duplex outlet

5. Telephone jack

6. Overhead garage door

7. Fan

8. Interior wall

9. Shelf and pole

10. Electric light

11. Switch

12. Waterproof duplex outlet

13. Sliding glass door

14. Exterior window

15. 220 outlet

16. Bi-fold wardrobe door

Floor Plans Examination continued

17. Sliding wardrobe door

18. Bathtub

19. Shower

20. Toilet

21. Pocket door

22. TV outlet

23. Fireplace

24. Brick veneer

25. Hot water tank

26. Furnace (oil or gas)

27. All floor plans have 3 line dimensions. What is dimensioned in line---

    1.

    2.

    3.

28. What is the scale in which residential blueprints are drawn?

29. What is the standard width of hallways?

30-35. On all F.H.A. drawn plans there are detail drawings of floor plan features. List 6 of these features.

    30.

    31.

Floor Plans Examination continued

32.

33.

34.

35.

2. Foundation Plans

a. Using the proper architectural symbols and conventions, indicate the following:

1. Footings

a. Standard:

b. Brick veneer:

2. Foundations

a. Standard:

b. Brick veneer:

3. Block-outs

a. Screened vents (size):

b. Access door (size):

c. Entrance doors:

4. Location of reinforcing rods

a. Porches:

b. Patios:

5. Concrete garage floor and apron:

6. Concrete footing blocks:

7. Fireplace footing:

8. Support posts:

9. Beams or girders:

10. Subflooring

    a. Joist floor:

    b. Beam & decking:

    c. Beam & 2-4-1:

11. Ground cover:

b. All pertinent dimensions will appear on the foundation plan:

    1. Overall dimensions

    2. On center dimensions of beams and posts

    3. Garage door opening

    4. Footing and foundation sizes

c Sheet name and scale will be indicated.

d. Upon completion of this portion of Unit Three, each student will be required to successfully pass a foundation plan examination.

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Unit III: Foundation Plans Examination Name_____

1. What is the size of a standard footing?

2. What is the size of a standard foundation?

3. What is the size of a footing when brick veneer is used?

4. What is the size of a foundation when brick veneer is used?

5. What is the size of a screened vent?

6. What is the size of an access hole?

7. Define block-out.

8. What is the purpose of reinforcing rods?

9. How is the concrete garage floor indicated on a plan?

10. What is the notation for ground cover?

11-13. Name three common subfloor types:

11.

12.

13.

14. What is the size of opening in the garage foundation when using a 9⁰ x 7⁰ O.H. Gar. Dr.?

15. When cardecking is used, how is it indicated on the foundation plan?

16. Using the proper symbol, indicate a footing and foundation.

17. Using the proper symbol, indicate a footing and foundation with brick veneer.

18. What is the standard size of footing blocks?

19. What is the size of the beams when cardecking is used?

20. What is the size of the beams when 2-4-1 plywood is used?

21. What is the size of the posts when cardecking is used?

22. What is the standard spacing of posts when cardecking is used?

23. What is cross bridging and where is it used?

24. What is solid bridging and where is it used?

25. What type of house requires joist floor construction?

3. Elevations

a. Using the proper architectural symbols and conventions indicate how each of the following is drawn:

1. Front and right elevation:

2. Rear and left elevations:

a. Grade lines:

b. Concrete foundation:

c. Concrete porches, steps and patios:

d. Position and style of doors, windows and overhead garage doors:

e. Type of siding

1. Vertical:

2. Horizontal:

f. Brick veneer:

g. Roof style

1. Gable:

2. Hip:

3. French Hip:

4. Mansard:

5. Gambrel:

6. Shed:

7. Flat:

h. Type roofing material used:

i. Type of gutter used:

j. Type of cornice construction:

k. Position and height of chimney:

l. Flashing and counterflashing:

b. All pertinent dimensions will be indicated.

c. Sheet name and scale will be indicated.

4. Additional required details:

a. City-county and F.H.A. codes require the following detailed drawings.

1. Plot plan

a. Position of building on site:

b. Set-backs:

c. Grade elevations in relation to street:

d. Position of power poles, sewers and/or septic tanks and drainfields, sidewalks and driveways:

e. North indication:

f. Site size:

g. Street name and building number:

h. Legal description:

i. Sheet name and scale:

2. Through section

a. Footing and foundation type:

b. Subfloor type:

c. Wall construction including interior and exterior finish:

d. Joist and roof construction:

e. Gutter and cornice construction:

f. Roof covering:

g. Sheet name and scale:

3. Porch section

   a. Footing and foundation type:

   b. Subfloor type:

   c. Door positioning:

   d. Concrete porch positioning:

   e. Sheet name and scale:

4. Fireplace and chimneys

   a. Stack and flue construction:

   b. Fire box construction:

   c. Internal fireplace construction:

5. Septic tank and distribution box detail

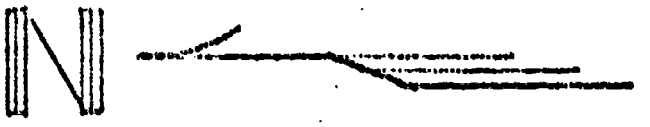
   a. Cleanout detail:

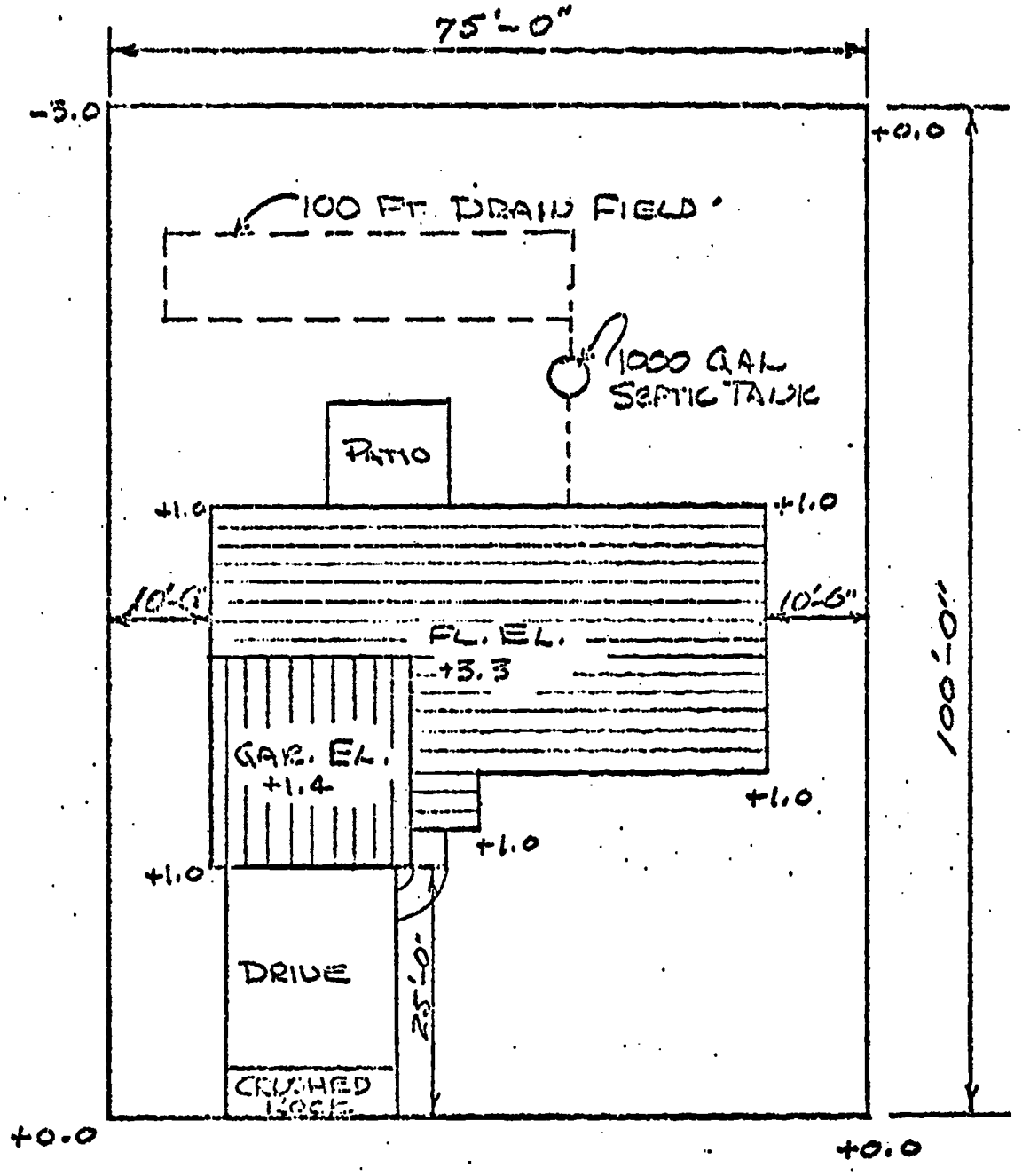
   b. Section view of septic tank and distribution box:

   c. Tight line to drain field:

   d. Sheet name and scale:

b. Upon completion of this portion of Unit Three, each student will be required to successfully pass an evaluation and details examination.



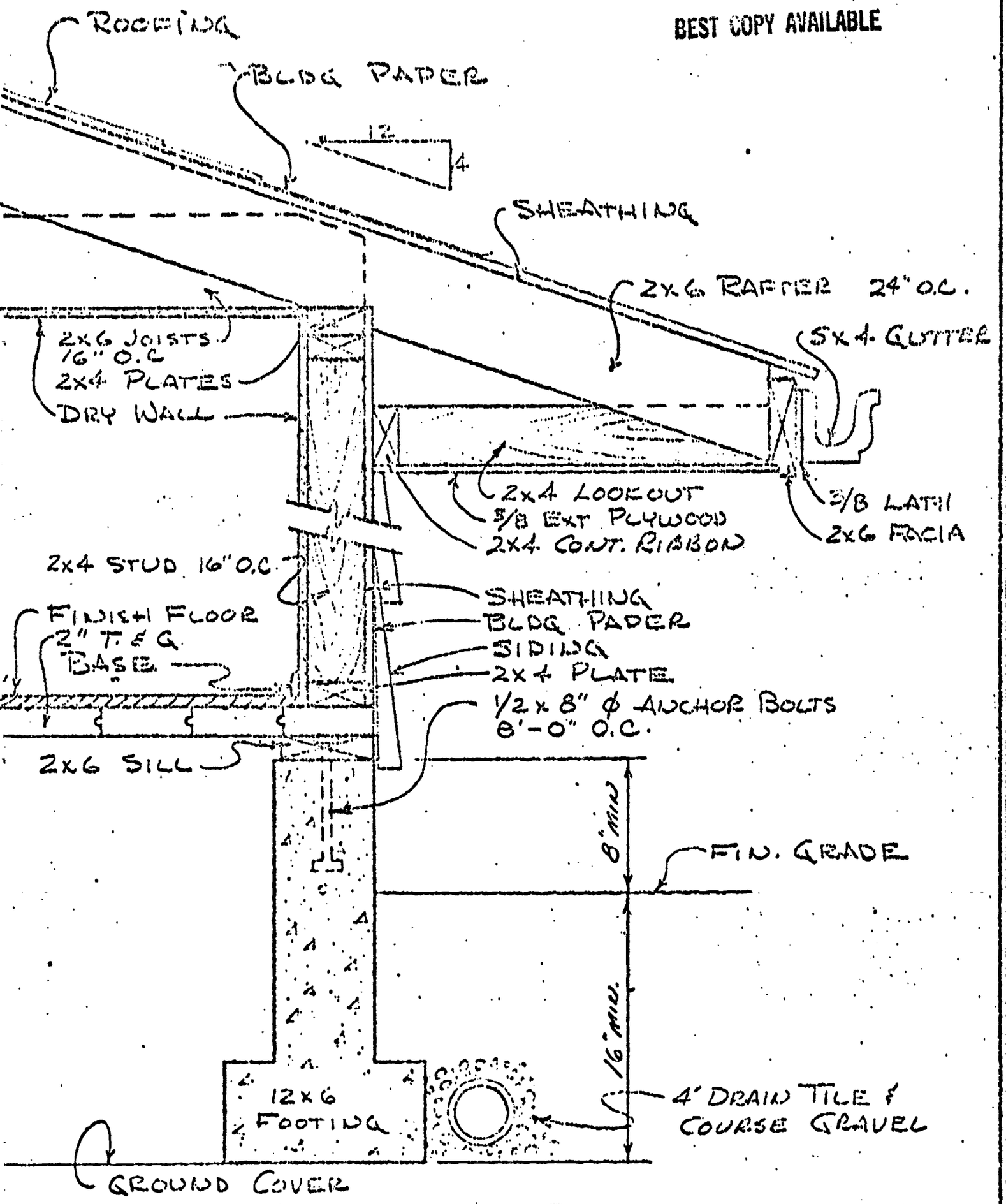


LEGAL:

SOUTH 12.5 FT. OF LOT 13, LOTS 14, 15 AND THE NORTH 12.5 FT. OF LOT 16, BLOCK 13, DOWNEY ADDITION, PIERCE COUNTY.

PLOT PLAN

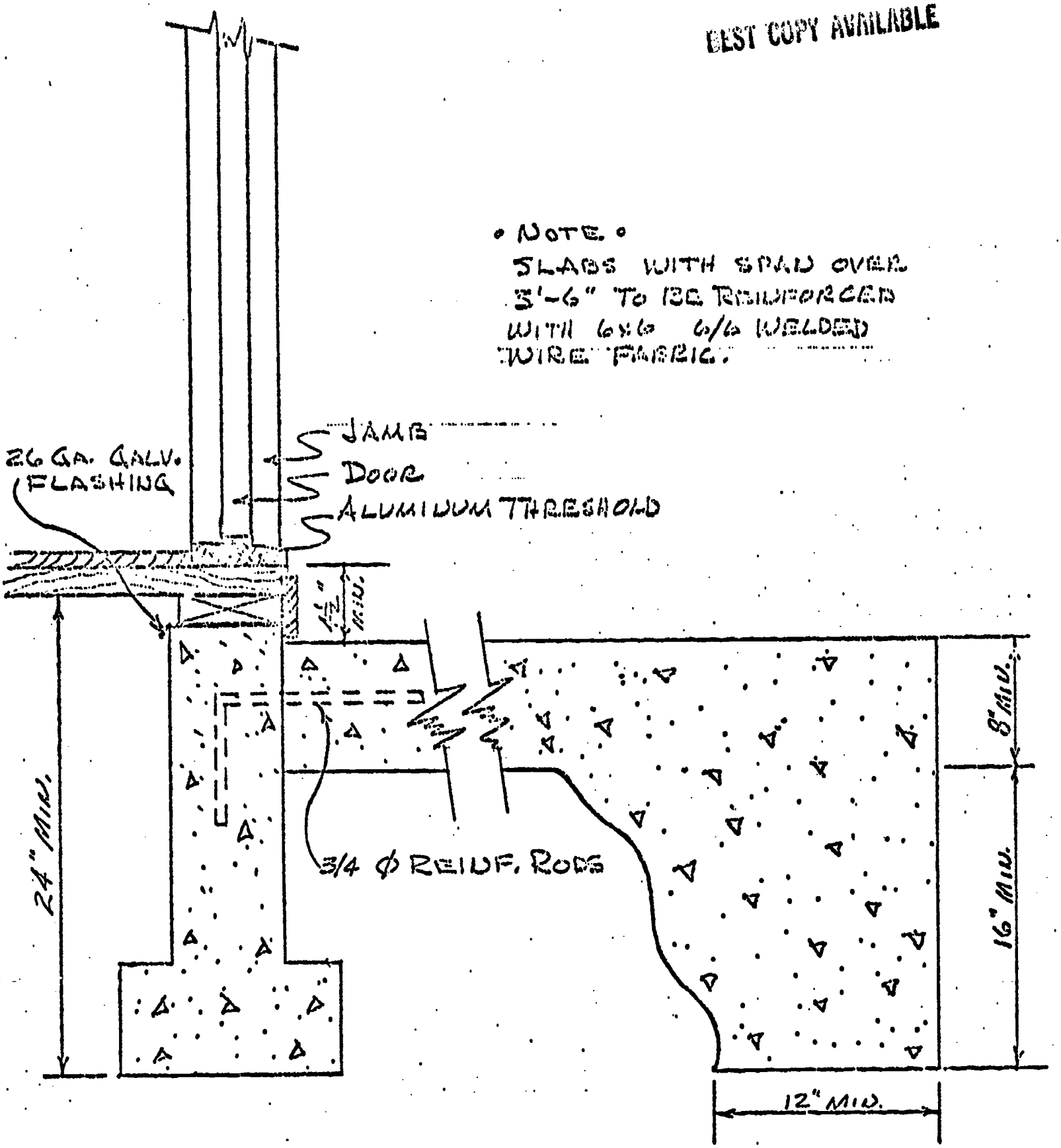
SCALE 1"=20'-0"



• TYPICAL SECTION •

SCALE 1½" = 1'-0"

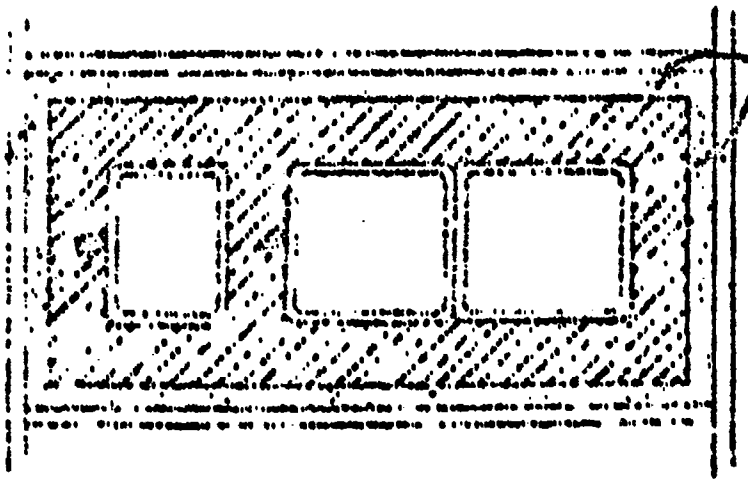
• NOTE •
SLABS WITH SPAN OVER 5'-6" TO BE REINFORCED WITH 6x6 6/6 WELDED WIRE FABRIC.



• PORCH SECTION •
SCALE 1½" = 1'-0"

FIREPLACES & CHIMNEYS

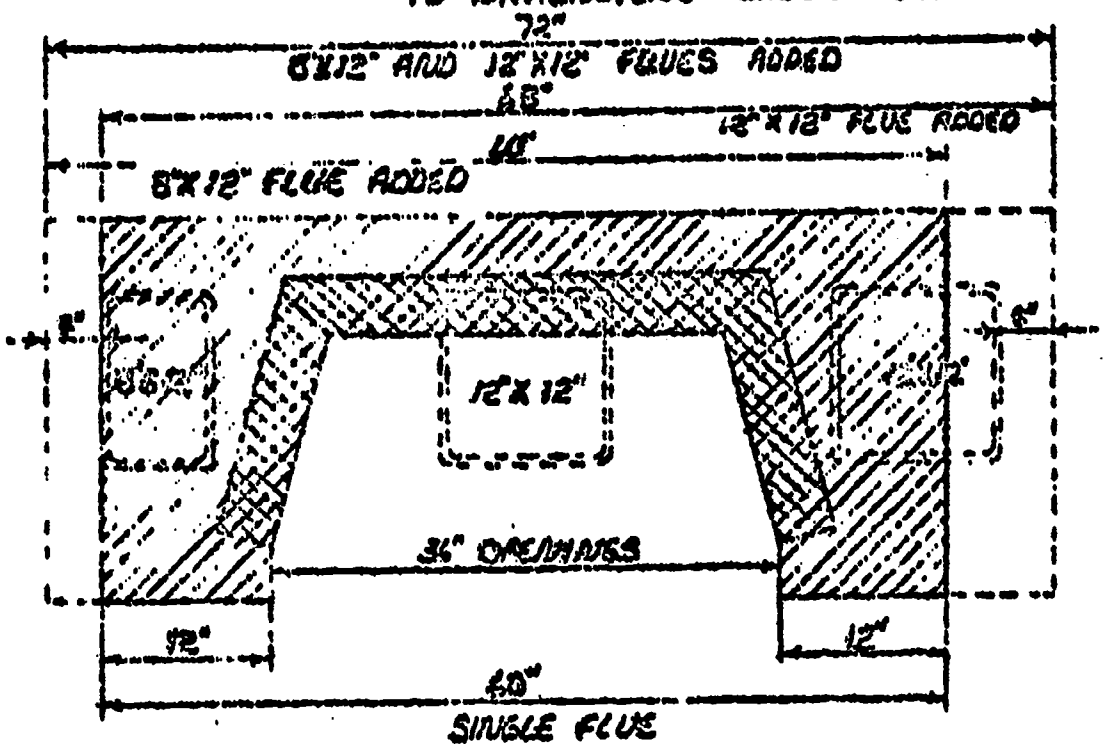
CONSTRUCTION SHALL COMPLY WITH F.H.A.
MINIMUM PROPERTY STANDARDS
SEC. 813 THRU 813-3.1 FOR CHIMNEYS
SEC. 814 THRU 814-5.2 FOR FIREPLACES

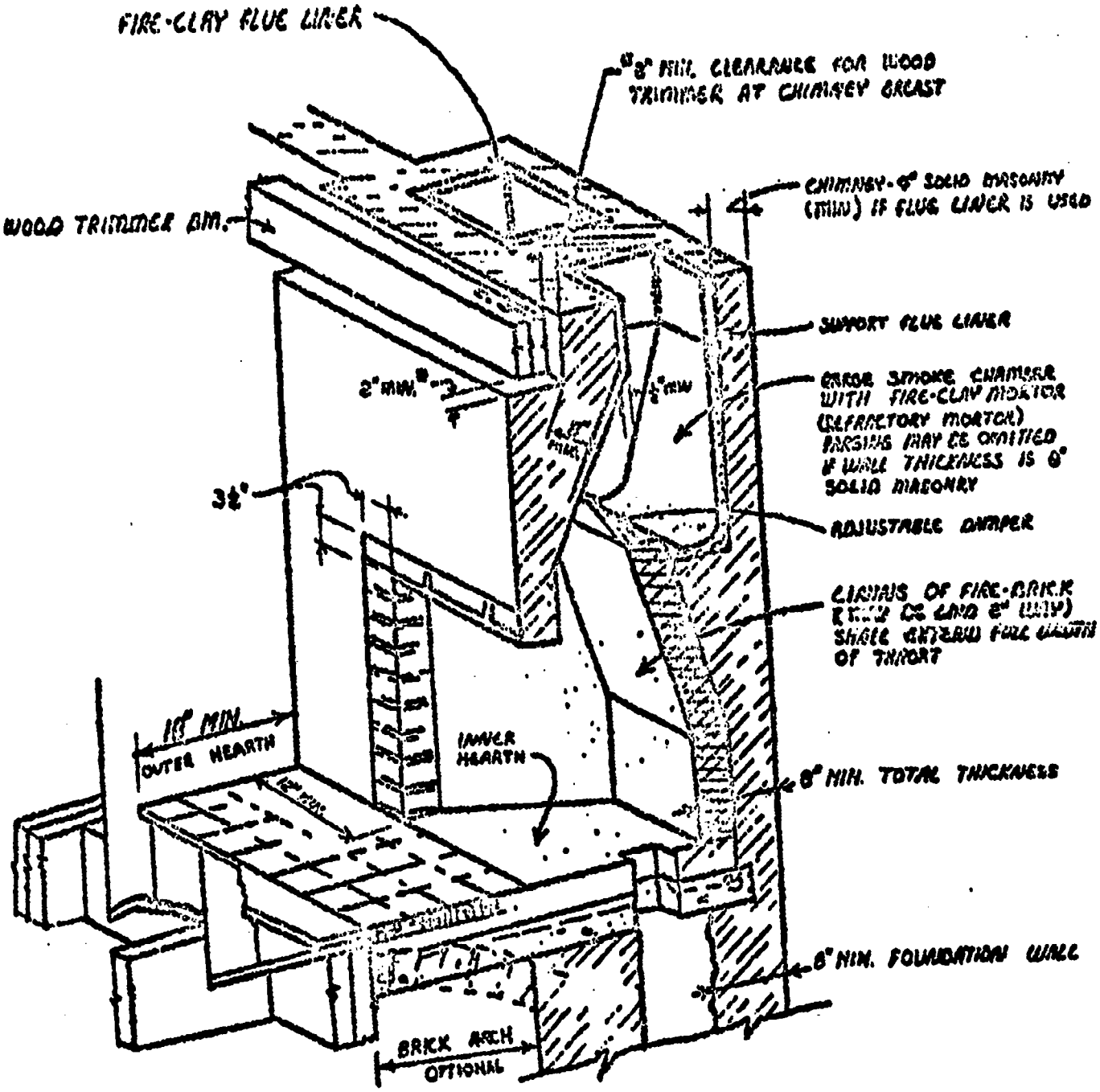


2" AIRSPACE FOR FRAMING MEMBERS AIRSPACE SHALL BE FIRESTOPPED AT EACH FLOOR LEVEL WITH NON-COMBUSTIBLE MATERIAL, PER SECTION 813-2.6c (1) MPS

WHERE MORE THEN 2 FLUES, INSTALL A 4" WYTHE, PER SEET 813-2.5a MPS

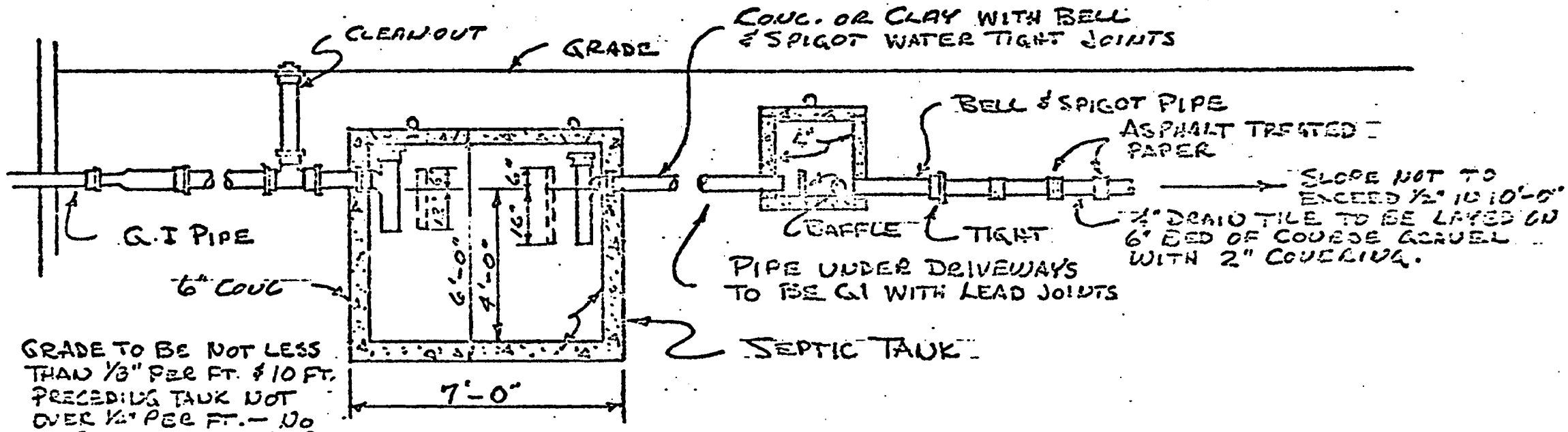
NOTE: FOR ROUGH OPENINGS, ADD 4" TO DIMENSIONS SHOWN BELOW





*PROVIDE NOT LESS THAN 8" OF SOLID MASONRY AS INDICATED BETWEEN SMOKE CHAMBER AND FACE OF CHIMNEY BREAST WHEN WOOD TRIMMER IS USED

EXAMPLE: MASONRY FIREPLACES 814-4



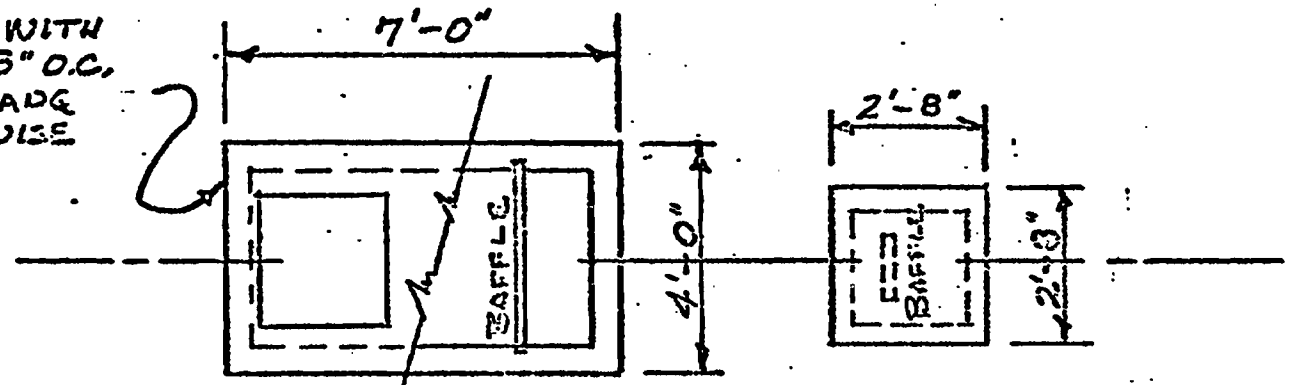
GRADE TO BE NOT LESS THAN 1/8" PER FT. & 10 FT. PRECEDING TANK NOT OVER ½" PER FT. — NO 90° ELLS — ALL 45° ELLS TO HAVE CLEANOUTS.

1-105-

° SEPTIC TANK & DIST. BOX SECTION °

COMPLY WITH SECTION 1103-63 M.P.S.

REINF. TOP WITH 3/8" BARS 16" O.C. LENGTHWISE AND 8" O.C. CROSSWISE



° SEPTIC TANK & DIST. BOX PLAN °

SCALE ¼"=1'-0"

110

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Unit III: Elevations Examination Name_____

1-12. Directions: Using the plan that you have before you, list twelve different features that appear on the elevations of all construction plans. If the item is metal or wood, indicate type of wood or metal. Be specific.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13-17. There are six different roof styles that we have discussed in class. List five of these roof styles.

13.

14.

15.

16.

17.

18-21. There are four individual detail drawings on 9 x 11 paper attached to all construction plans. List these four drawings.

18.

19.

20.

21.

22. What is the scale in which elevation drawings are done?

23-26. There are usually two elevation sheets on a construction plan showing all four elevations. In what order are these drawn?

23.

24.

25.

26.

BONUS:

27-30. As usual on an examination, I may have forgotten an important item. If you can name one item that I have forgotten to include on this exam, I will give you four bonus points. Check elevations very closely and find one if you can.

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UNIT FOUR: Interpreting and Applying Various Building Codes Used In This Area

OBJECTIVE: Upon completion of this unit each student will have knowledge of the various building codes that regulate dwelling construction in this area.

RESOURCE MATERIALS:

1. Textbook: Uniform Building Code, 1967 Edition, pages 5-8
2. Verifax copies: F.H.A. Minimum Property Standards, pages 1-4
3. Mimeographed copies of Communications Terminology

STUDENT RESPONSIBILITY:

A. 1. Define terms that are important in this unit.

B. 1. Be able to read and intelligently discuss each section of the Legal Requirements, pages 5-8.

C. 1. Refer to the supplementary paper which details the necessary important points in each section.

D. 1. Convert each important point into a well-written sentence that is of your vocabulary. Upon completion, submit for grading.

E. 1. Be prepared for test upon terminology.

2. Be prepared for testing upon important points you have written into sentences.

Supplementary Paper for Unit Four

NOTE: Each of the twelve sections is included in the list below. After each you will see a number. This number indicates the number of important points that must be written into sentence form. Thus, if a section has 3 written after it, you must find 3 important points and write them into 3 separate sentences. You will receive help from the teacher as you do this.

1. Building Permit - 1
2. Double Fees - 2
3. Penalties - 1
4. Information on Plans and Specifications - 4
5. Inspection Record Card - 2
6. Approvals Required - 6
7. Location on the Lot - 2
8. Windows - 4
9. Ceiling Heights - 2
10. Room Sizes - 5
11. Sanitation - 4
12. Private Garages - 3

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Unit Four: Communications Terminology

The following terms are provided with definitions. You are expected to study them and be prepared for testing on the spelling of selected terms and definitions of selected terms.

1. Uniform Building Code: A booklet distributed by a local government that sets forth required standards for safe construction of dwelling units.

2. F.H.A. Minimum Property Standards: Federal Housing Authority standards that set forth the minimum standards to be met when building a dwelling unit in the United States.

3. Application Form: A detailed form to be filled out by a prospective builder when applying for a building permit.

4. Building Permit: A permit issued by a local government allowing a person to begin work on a building site.

5. Building Official: A representative of a local government who personally supervises and controls building under his jurisdiction.

6. Double Fees: A penalty assessed a builder who begins construction before he receives a building permit.

7. Penalties: Legal punishment by a local government when a builder violates a provision of the Uniform Building Code.

8. Misdemeanor: A minor crime committed by a builder when he violates a provision of the Uniform Building Code.

9. Provisions of the Code: The ordinances, rules and regulations of the Uniform Building Code.

10. Plans and Specifications: Detailed drawings and factual information illustrated on paper or cloth to show that a proposed structure conforms to the Code.

11. Laws, Ordinances, Rules, and Regulations: Controls and restrictions established by a local government that regulates construction.

12. Plot Plan: The blueprint drawing that shows the location of structures that are to be built on a building site.

13. Inspection Record Card: A card that is posted on a building site and is filled in by the Building Official after each inspection of the work.

14. Certificate of Occupancy: A certificate issued by the Building Official after all inspections and declares the structure is ready for occupancy.

15. Written Approval: Notification in writing by the Building Official that construction can begin before and after each building inspection.

16. Foundation Inspection: An inspection made by the Building Official after excavation and forms have been laid and before the concrete has been poured for the foundation of a structure.

17. Frame inspection: An inspection made by the Building Official after the roof, all framing, fire-blocking and bracing are in place and all pipes, chimneys, and vents are complete.

18. Wallboard Inspection: An inspection made by the Building Official after all interior and exterior wallboard is in place, but before plastering has begun.

19. Final Inspection: An inspection made by the Building Official after the structure is completed and is ready for occupancy.

Purpose

The purpose of the National Housing Act, as stated in the preamble, is "to encourage improvement in housing standards and conditions, to provide a system of mutual mortgage insurance, and for other purposes."

In pursuance of this purpose, the Federal Housing Administration has established these Minimum Property Standards. They are intended to obtain those characteristics in a property which will assure present and continuing utility, durability and desirability as well as compliance with basic safety and health requirements. To provide this assurance, these standards set forth the minimum qualities considered necessary in the planning, construction and development of the property which is to serve as security for an insured mortgage.

As these standards define the minimum level of quality acceptable to FHA, a property complying with them is considered technically eligible in all FHA insuring office jurisdictions. Other factors however, such as the appropriateness of the dwelling to the site and to the neighborhood and the anticipated market acceptance of the property as a whole must also be considered in FHA underwriting analysis.

Planning and construction which exceed the minimums set forth herein and which will result in increased marketability of the property or which will reduce the expense of maintenance or early replacement of equipment, will be reflected in the FHA estimate of value.

The standards are based upon extensive study by the technical staff of FHA headquarters and field offices, and upon recommendations of builders, architects, engineers and material producers. While they represent good current practice in residential technology, they may be modified in the future as additional data and experience are gained.

The standards are not intended to serve as a building code. Such codes are primarily concerned with factors of health and safety and not the many other aspects of design and use which are included herein as essential for mortgage insurance determinations.

Chapter I

Required Exhibits

CONTENTS

100 GENERAL

100–1 Architectural and engineering exhibits shall be submitted with each application for mortgage insurance which involves proposed construction, partially completed construction, or alterations or additions to existing construction. Exhibits for alterations or repairs need pertain only to work to be done.

100–2 The exhibits shall indicate and describe all proposed work, including the location and size, grade and quality of materials and equipment to be incorporated in the improvements. Adequate and accurate exhibits are necessary:

a. To determine compliance with the applicable FHA Minimum Property Standards.

b. To prepare the FHA cost estimate.

c. To measure the degree of mortgage risk attributable to the improvements, and

d. To provide a basis for the builder's warranty.

101 DRAWINGS FOR INDIVIDUAL APPLICATIONS

101–1 Drawings for individual applications shall be submitted in duplicate and provide at least the following information.

101–2 PLOT PLAN

101–2.1 Scale, 1″=20′ or 1/16″=1′ 0″ minimum.

101–2.2 Lot and block number.

101–2.3 Dimensions of plot and north point.

101–2.4 Dimensions of front, rear and side yard.

101–2.5 Location and dimensions of garage, carport and other accessory buildings.

101–2.6 Location of walks, driveways, and approaches.

101–2.7 Location of steps, terraces, porches, fences, and retaining walls.

101–2.8 Location and dimensions of easements and established setback requirements, if any.

101–2.9 Elevations at the following points:

a. First floor of dwelling, and floor of garage, carport and other accessory buildings.

b. Finish curb or crown of street at points of extension of lot lines.

c. Finish grade elevation at each principal corner of structure.

101–2.10 The following additional elevations, as applicable, shall be submitted if the topography or the design of the structure is such that special grading, drainage, or foundations may be necessary. Examples are irregular or steeply sloping sites, filled areas on sites, or multi-level structure designs.

a. Finish and existing grade elevations at each corner of plot.

b. Existing grade at each principal corner of dwelling.

c. Finish grade at both sides of abrupt changes of grade such as retaining walls, slopes, etc.

d. Other elevations that may be necessary to show grading and drainage.

101–2.11 Indication of lot grading type and approximate location of drainage swales.

101–2.12 Where an individual water-supply or sewage-disposal system is proposed, submit the additional information required by 104.

101–2.13 See Example Plot Plan No. 1, page 5.

101–3 FLOOR PLANS

101–3.1 Scale, ¼″=1′ 0″.

101–3.2 Floor plan of each floor and of basement, if any.

101–3.3 Plan of all attached terraces and porches, and of garage or carport.

101–3.4 If dwelling is of crawl space type, provide separate foundation plan. Slab type foundation may be shown on sections.

101–3.5 Direction, size and spacing of all floor and ceiling framing members, girders, columns or piers.

101–3.6 Location of all partitions and indication of door sizes, and direction of door swing.

101–3.7 Location and size of all permanently installed construction and equipment such as kitchen cabinets, closets, storage shelving, plumbing fixtures, water heaters, etc. Details of kitchen cabinets may be on separate drawing.

101–3.8 Location and symbols of all electrical equipment, including switches, outlets, fixtures, etc.

101–3.9 Heating system, on separate drawing or as part of floor or basement plan showing:

a. Layout of system.

b. Location and size of ducts, piping, registers, radiators, etc.

c. Location of heating unit and room thermostat.

d. Total calculated heat loss of dwelling including heat loss through all vertical surfaces, ceiling, and floor. When a duct or piped distribution system is used, calculated heat loss of each heated space.

101–3.10 Cooling system, on separate drawings or as part of heating plan, floor or basement plan showing:

a. Layout of system.

b. Location and size of ducts, registers, compressors, coils, etc.

c. Heat gain calculations, including estimated heat gain for each space conditioned.

d. Model number and Btuh capacity of equipment or units in accordance with applicable ARI or ASRE Standard.

e. Btuh capacity and total KW input at stated local design conditions.

f. If room or zone conditioners are used, provide location, size and installation details.

101–4 EXTERIOR ELEVATIONS

101–4.1 Scale, ¼″=1′ 0″. Elevations, other than main elevation, which contain no special details may be drawn at ⅛″=1′ 0″.

101–4.2 Front, rear and both side elevations, and elevations of any interior courts.

101–4.3 Windows and doors– indicate size unless separately scheduled or shown on floor plan.

101–4.4 Wall finish materials where more than one type is used.

101–4.5 Depth of wall footings, foundations, or piers, if stepped or at more than one level.

101–4.6 Finish floor lines.

101–4.7 Finish grade lines at buildings.

101–5 DETAILS AND SECTIONS

101–5.1 Section through exterior wall showing all details of construction from footings to highest point of roof. Where more than one type of wall material is used, show each type. Scale, ⅜″=1′ 0″ minimum.

101–5.2 Section through any portion of dwelling where rooms are situated at various levels or where finished attic space is proposed. Scale, ¼″=1′ 0″ minimum.

101–5.3 Section through stair wells, landings and stairs, including headroom clearances and surrounding framing. Scale, ¼″=1′ 0″ minimum.

101–5.4 Details of roof trusses if proposed, including connections and stress or test data. Scale of connections, ⅜″=1′ 0″ minimum.

101–5.5 Elevation and section through fireplace. Scale, ⅜″=1′ 0″ minimum.

101–5.6 Elevations and section through kitchen cabinets, indicating shelving. Scale, ¼″=1′ 0″ minimum.

101–5.7 Sections and details of all critical construction points, special structural items or special millwork. Scale as necessary to provide information, ⅜″=1′ 0″ minimum.

102 DRAWINGS FOR GROUP APPLICATIONS

102–1 GENERAL

102–1.1 When a number of applications simultaneously submitted involve repetition of a basic-type dwelling, special group drawings should be submitted in lieu of drawings for each individual property. Drawings shall be in triplicate unless otherwise required by the FHA field office.

102–1.2 The exhibits described herein are required only to the extent needed to supplement the information shown on the street improvement plans, subdivision grading plans and other development plans and specifications submitted as part of a subdivision proposal. Duplicate submission of data is not required. See Exhibit Data Sheets in Neighborhood Standards, Land Planning Bulletin No. 3.

102–2 MASTER PLOT PLAN

Information required on Master Plot Plan shall include the following:

102–2.1 Scale—That which will provide the following information in a clear and legible manner.

102–2.2 North point.

102–2.3 Location and width of streets and rights of way. Indicate type of surfacing on streets.

102–2.4 Location and dimensions of all easements.

102–2.5 Dimensions of each lot.

102–2.6 Location of each dwelling on lot with basic dimensions.

102–2.7 Dimensions of front, rear, and side yards.

102–2.8 Location and dimensions of garages, carports, or other accessory buildings.

102–2.9 Location of walks, driveways and other permanent improvements.

102–2.10 Identification of each lot by number and indication of basic plan and elevation type.

102–3 TYPICAL PLOT PLAN

102–3.1 A typical plot plan for each basic-type dwelling may be submitted in lieu of full detailing each lot on Master Plot Plan, when topography and lot arrangements present no individual planning or construction problems. Information not shown on typical plot plan shall be included on Master Plot Plan.

102–3.2 Typical plot plans shall not be used for corner lots, lots with irregular boundaries, lots involving pronounced topographic variations or other lots where individual detailing is necessary.

102–3.3 Show location of dwelling on typical lot and full dimensions.

102–3.4 Provide location and dimension of all typical improvements such as garage, carport, accessory buildings, walks, drives, steps, porches, terraces, retaining walls, fences, etc.

102–3.5 Show landscaping where provided.

102–4 MASTER LOT GRADING PLAN

Grading may be shown on separate grading plan or on the Master Plot Plan. Scale of Master Plot Plan or Grading Plan shall be sufficiently large to provide the following information in clear and legible manner:

102–4.1 Contours of existing grade at intervals of not more than 5 feet. Intervals less than 5 feet may be required when indicated by the character of the topography. See FHA data sheet (series 79) for applications involving deep cuts and fills.

102–4.2 Location of house and accessory buildings on each lot.

102–4.3 Identification of each lot by number.

102–4.4 Elevations in accordance with 101–2.9 and 101–2.10 including bench mark and datum or,

102–4 MASTER LOT GRADING PLAN—*Continued*

102–4.5 In lieu of finish grade elevations, contours of proposed finish grading may be submitted. Contour intervals selected shall be appropriate to the topography of the site.

102–4.6 Indication of lot grading type and approximate location of drainage swales.

102–4.7 Location of drainage outfall if any drainage is not to a street.

102–5 FLOOR PLANS, ELEVATIONS, DETAILS AND SECTIONS

Floor plans, basement plans, exterior elevations, details and sections required by 101–3, 101–4, and 101–5 as applicable shall be submitted for each basic plan type. Alternate elevations to the basic plan may be shown at scale of $\frac{1}{8}'' = 1'\ 0''$.

103 DESCRIPTION OF MATERIALS

103–1 FHA Form 2005, Description of Materials, shall be submitted fully completed in accordance with instructions thereon.

103–2 Submit in duplicate for individual application.

103–3 Submit in triplicate for group application for each basic plan type, unless otherwise required by the FHA field office.

103–4 FHA Form 2005 may be reproduced provided size, format and printed text are identical to the current official form and the following deletions are made:

a. All lines Form FHA 2005/VA 4–1852.
b. The Budget Bureau number and approved expiration date, and
c. The U. S. Government imprint and reference numbers.

104 INDIVIDUAL WATER-SUPPLY AND SEWAGE-DISPOSAL SYSTEMS

When an individual water-supply or sewage-disposal system is proposed, the following additional information shall be submitted:

104–1 APPROVAL BY HEALTH AUTHORITY

104–1.1 A written opinion by the Health Authority having jurisdiction that the site is suitable for the proposed system, when required by the FHA field office.

104–1.2 A signature of the Health Authority having jurisdiction, on the plot plan, indicating approval of design of the proposed system, when required by the FHA field office.

104–2 PLOT PLAN

104–2.1 Location of septic tank, distribution box, absorption field or bed, seepage pits and other essential parts of the sewage-disposal system and distance to individual wells.

104–2.2 Location of well, service line, and other essential parts of the water-supply system.

104–2.3 Location of individual systems on adjacent properties if information is available. If wells are not involved on the subject property or adjacent properties, only that part of the sewage-disposal system on adjacent property within 10 feet of the property line need be shown.

104–2.4 See Example Plot Plan No. 2, page 6.

104–3 CONSTRUCTION DETAILS

Complete details of all component parts of individual water-supply or sewage disposal system. These details shall clearly indicate material, equipment, and construction.

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UNIT FIVE: Building Materials

OBJECTIVE: Upon completion of this unit, each student will have knowledge of the various construction materials used in this area.

RESOURCE MATERIALS:

1. Textbook (Unit 4)
2. Classroom resource materials
3. Resource Center

STUDENT RESPONSIBILITY:

A. 1. Read textbook, Unit 4

2. Utilize all resource materials including F.H.A. and city-county codes.

B. In a written report, discuss the following:

1. Differences between softwoods and hardwoods
2. Cutting methods
3. Lumber seasoning processes
4. Lumber defects
5. Hardwood and softwood grades
6. Lumber sizes (refer to table on page 456)
7. Plywood construction and types
8. Hardboard and particle board construction and uses
9. Identify and indicate uses of the following construction lumber used in this area:

   a. Douglas Fir
   b. Western Hemlock
   c. Western Red Cedar
   d. Redwood

10. Identify and indicate uses of the following finished lumber used in this area:

    a. Birch

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6. Lumber sizes (refer to table on page 456)
7. Plywood construction and types
8. Hardboard and particle board construction and uses
9. Identify and indicate uses of the following construction lumber used in this area:

   a. Douglas Fir
   b. Western Hemlock
   c. Western Red Cedar
   d. Redwood

10. Identify and indicate uses of the following finished lumber used in this area:

    a. Birch

b. Philippine Mahogany
c. Black Walnut
d. Sugar Pine

11. There are two basic sizes of nails used in fastening construction materials. Indicate sizes and where used.

12. Upon completion, submit for grading.

C. Located within the classroom are several samples of various building materials used in this area. Each student should be able to identify and indicate uses of the majority of these materials.

D. Request lumber identification and uses examination.

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Unit five: Building Materials Exam NAME:_____

1-2. There are two major classifications of lumber. Name them.

1._____

2._____

3. The answer to number one comes from a _____bearing tree.

4. The answer to number two comes from a _____bearing tree.

5-6. There are two methods of sawing lumber. Name them.

5._____

6._____

7. Define moisture meter.

8-9. There are two methods of seasoning lumber. Name these.

8._____

9._____

10-15. Match the following statements to the correct lumber defect.

_____Knots

_____Pitch Pockets

_____Splits & Checks

_____Wane

_____Decay

_____Holes

10. They may be made by wood boring insects or worms.
11. A separation of the wood fibers along the grain.
12. A disintegration of wood fibers due to fungi.
13. Caused by an imbedded branch or limb of the tree.
14. The presence of bark along the edge of a board.
15. Internal cavaties that contain a sticky substance.

16-19. There are four basic types of construction lumber used in this area. Name them.

16._____

17._____

18._____

19._____

20-23. There are four basic types of finish lumber used in this area. Name them.

20._____ 22._____

21._____ 23._____

24. Define plywood.

25. Define particle board.

26-27. Metal fasteners used in rough carpentry procedures in this area come in two sizes. Name them.

26._____d.

27._____d.

Lumber Identification & Uses

Directions: Several pieces of building materials are being passed around the class. Each is numbered according to the numbers on your test paper. Identify each as to name, type and use in building construction.

NAME	TYPE	USES
28._____	29._____	30._____
31._____	32._____	33._____
34._____	35._____	36._____
37._____	38._____	39._____
40._____	41._____	42._____
43._____	44._____	45._____
46._____	47._____	48._____

49. Our models are constructed from what type lumber?_____

50. The seats that you are sitting in have what type of wood tops?

_____.

UNIT 6: MEASUREMENT

OBJECTIVES: Upon completion of this unit the student will have demonstrated the ability to:

A. Read a ruler or steel tape to the nearest thirty-second of an inch.

B. Recognize geometric shapes

1. Triangle

a. Right
b. Isosceles
c. Equilateral

2. Rectangle

3. Square

4. Parallelogram

5. Trapezoid

6. Hexagon

7. Octagon

8. Circle

9. Cube

10. Rectangular Solid

11. Cylinder

C. Use the necessary formula to find perimeters, areas and volumes of appropriate figures in objective B.

D. Determine the number of board feet in a given piece of lumber.

E. Apply the above objectives to "word problems"

METHOD: The student will be given a teacher-made pre-test covering the stated objectives. If he passes the pre-test with a score of 95% or better, he will move into the next unit. If he fails to achieve 95% on the pre-test, the teacher will prescribe a list of assignments to meet his particular weaknesses. When the student has completed and checked the assignments in his prescription, he will take a teacher-made post-test covering the unit objectives. He must score 80% or better in order to continue to the next unit. If he fails to achieve at this level, a new prescription will be written and upon completion a second post-test will be given. If he again falls below 80%, a third prescription is given and upon completion a third post-test for which 70% accuracy is required.

Unit 6 continued:

RESOURCES:
1. Applied Math - Franklin Pierce School District, 1968.
2. Practical Problems in Mathematics - Carpentry Trades; Delmar Publishers, Inc., 1962.
3. Holt General Mathematics - Kinney, Ruble, Blythe; Holt, Rinehart & Winston, Inc., 1960.

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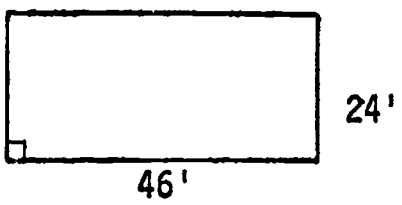
MATHEMATICS

UNIT 6: Measurement

NAME: _____

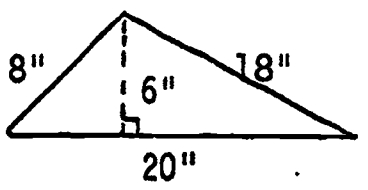
PRE-TEST

LABEL ANSWERS WITH CORRECT UNIT OF MEASUREMENT

1. 

Perimeter = _____

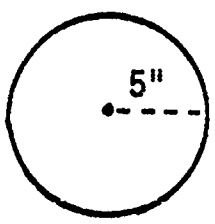
Area = _____

2. 

Perimeter

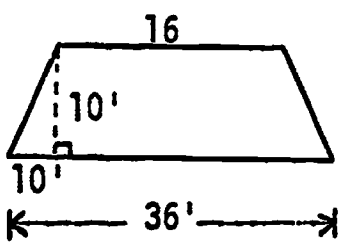
Perimeter = _____

Area = _____

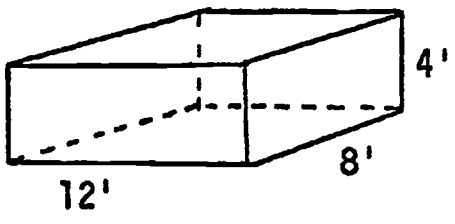
3. 

Area = _____

Circumference = _____

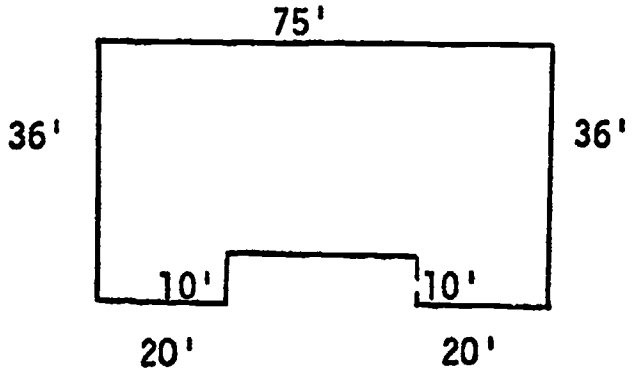
4. 

Area = _____

5. 

Volume = _____

6. Find area & perimeter of this figure:



Area = _____

Perimeter = _____

7. Find the number of board feet in each:

   a) 5 pcs. 1" x 6" x 18'

   b) 34 pcs. 2" x 4" x 16'

   c) 6 pcs. 2" x 10" x 14'

8. Find the number of cubic yds. of concrete needed for 124' of standard 24" foundation wall and footing.

9. When wood shingles are being laid, an allowance of 5 3/4 lbs. of 4d nails is made for each square of shingles. How many lbs. of nails are needed to lay shingles over 2,250 sq. ft. of roof?

10. What is the cost of the concrete for a garage floor 21' wide, 27' long and 4" thick if concrete costs $16 per cu. yd.?

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UNIT 6: Measurement

NAME:_____

Assignments

Texts: (1) Applied Math
(2) Practical Problems in Mathematics - Carpentry Trades
(3) Holt General Math

Concept

Formulas	1.	(1) Study pages 40-41 Do problems 6-10; pages 43-44
Using Formulas	2.	(1) Do problems 1, 4, 8; page 44 Do problems 2, 3, 4, 8, 9; page 45
Board Feet	3.	(2) Study page 64 Do problems 11-20; page 66
Area	4.	(2) Do problems 1, 6; page 86 Do problems 1, 2, 8; page 89
Perimeter and Areas	5.	(3) Do section A and B, pages 319-320
Perimeters and Areas	6.	(3) Do problems 1, 3, 4, 5, 8, 9, 10, 12-16; pages 322-323
Volume	7.	(3) Do problems 1-13; pages 330-331
Volume	8.	(2) Do problems 17, 18, 25, 31, 34; pages 68-69
	9.	Test

Assignment	1	2	3	4	5	6	7	8	Test
Number of Problems	9	10	10	5	19	12	18	5	
Number Correct									
Date Finished									

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MATHEMATICS

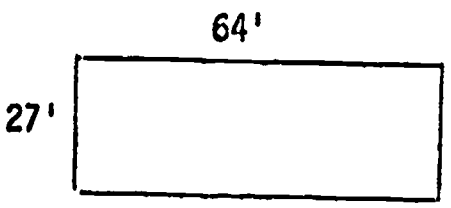
UNIT 6: Measurement

Name: _____

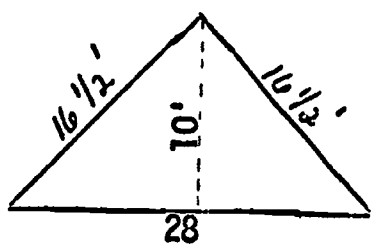
POST-TEST 1

FIND THE AREA AND PERIMETER OF EACH FIGURE

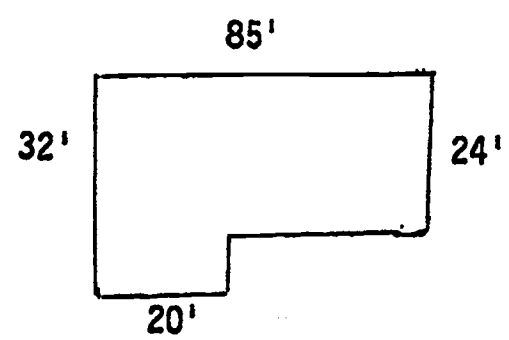
1.



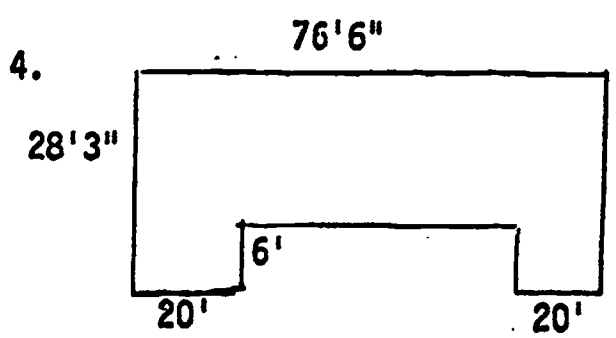
2.



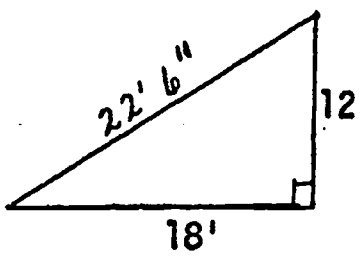
3.



4.



5.



6. FIND BOARD FEET:

10 pcs. 2"x8"x12'

125 pcs. 2"x4"x8'

16 pcs. 4"x6"x24'

30 pcs. 1"x3"x12'

14 pcs. 2"x6"x16'

T. I. P.

MATHEMATICS

UNIT 6: Measurement

Name: _____

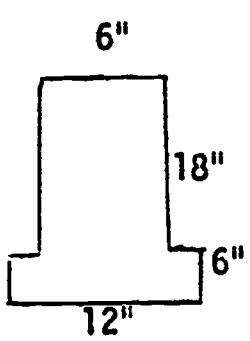
POST-TEST 2

SHOW YOUR WORK

1. JOE HAS A RECTANGULAR SURFACE TO PAINT. IT MEASURES 140' BY 30'. WHICH IS MORE ECONOMICAL AND HOW MUCH MORE: TO USE PAINT AT $5.80 per GALLON THAT WILL COVER 300 sq. ft. OF SURFACE OR PAINT AT $5.15 PER GALLON THAT WILL COVER 210 sq. ft. OF SURFACE?

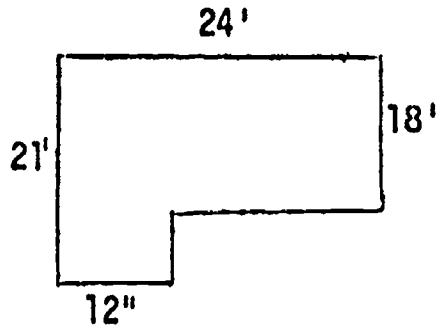
2. SUPPOSE YOU WANT TO POUR A 16' BY 24' CONCRETE PATIO YOU DECIDE TO POUR CONCRETE TO A DEPTH OF 4". IF CONCRETE IS SOLD FOR $18 A CUBIC YARD AND YOU CAN ORDER IT TO THE NEAREST QUARTER YARD, HOW MUCH WILL THE CONCRETE COST YOU IF YOU DO THE JOB YOURSELF? A CONTRACTOR CHARGES 37¢ per sq. ft. FOR THE WHOLE JOB, HOW MUCH DO YOU SAVE BY DOING THE JOB YOURSELF?

3. JIM IS MAKING A TOY BOX FOR HIS BROTHER. HE IS MAKING IT 6' LONG, 4' HIGH AND 2' WIDE. IF LUMBER COST 12¢ a sq. ft., HINGES 89¢ A PAIR, A HANDLE FOR 39¢ AND PAINT FOR $1.25, HOW MUCH WILL IT COST HIM TO BUILD?

4. 

THIS IS A CROSS SECTION OF A STANDARD FOUNDATION. FIND THE NUMBER OF CUBIC YARDS OF CONCRETE NEEDED FOR 186' OF THIS FOUNDATION (CORRECT TO NEAREST 1/4 cu. yd.)

5.



FIND THE NUMBER OF SQ. YDS. OF CARPET NEEDED FOR THIS ROOM.

6. FIND THE NUMBER OF BOARD FEET OF LUMBER IN EACH.

A) 18 pcs. 2"x8"x16'

B) 3 pcs. 4"x6"x18'

C) 30 pcs. 1"x4"x12'

T. I. P.

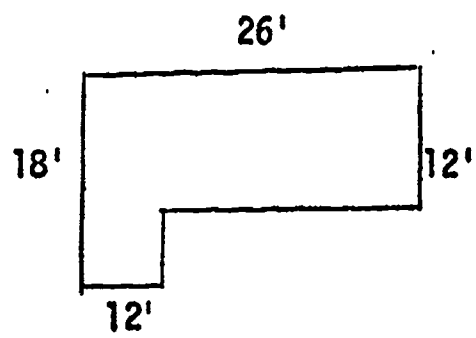
MATHEMATICS

UNIT 6: Measurement

Name: _____

POST-TEST 3 SHOW YOUR WORK!!!!

1. HOW MANY LINEAL FEET OF BASEBOARD NEEDED FOR THE LIVING ROOM SHOWN?

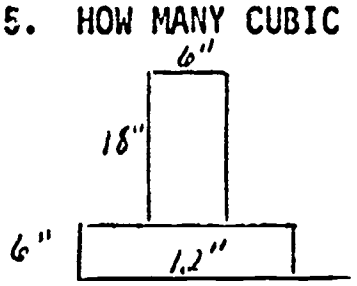


2. FIND THE COST OF COVERING THE LIVING ROOM FLOOR (16 ft. long and 14 ft. wide) WITH CARPET THAT COSTS $11.95 PER SQUARE YARD.

3. A CONCRETE DRIVEWAY IS TO BE 12' WIDE AND 39' LONG AND 4" THICK. HOW MANY CUBIC YARDS OF CONCRETE ARE NEEDED?

4. ALLOWING 82 SQ. FT. FOR WINDOWS AND DOORWAYS, HOW MANY GALLONS OF PAINT ARE NEEDED TO COVER THE WALLS AND CEILINGS OF A ROOM 17 FEET LONG, 16 FEET WIDE AND 10 FEET HIGH WITH TWO COATS OF PAINT? (ONE GALLON COVERS 425 SQ. FT. WITH ONE COAT.) AT $6.25 PER GALLON, HOW MUCH WILL THE PAINT COST?

5. HOW MANY CUBIC YARDS OF CONCRETE ARE NEEDED FOR 192 FT. OF STANDARD FOUNDATION?



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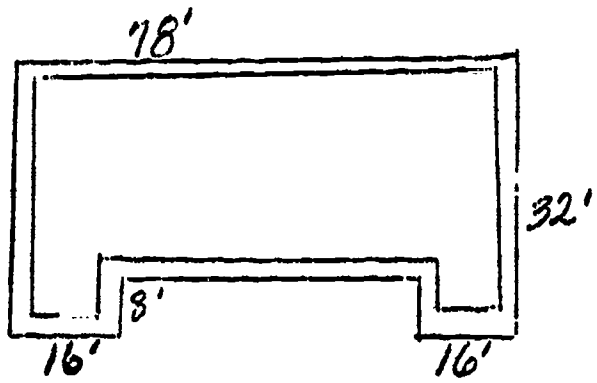
6. HOW MANY FEET OF MUD SILL ARE NEEDED FOR THIS FOUNDATION PLAN?

HOW MANY SQ. FT. IN THE HOUSE?



FIND THE NUMBER OF BOARD FEET IN EACH OF THE FOLLOWING.

7. 32 pc. 2"x4"x12'

8. 5 pc. 1"x6"x20'

9. 16 pc. 1"x8"x14'

10. 60 pc. 2"x6"x16'

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

UNIT SIX: Footings and Foundations

OBJECTIVE: Upon completion of this unit each student will have knowledge of and experience in the construction of footing and foundation forms, pouring of concrete, and stripping forms.

RESOURCE MATERIALS:

1. Textbook (Unit 6)
2. Classroom resource materials
3. Resource Center
4. On-site construction through independent study

STUDENT RESPONSIBILITY:

A. 1. Read unit in textbook

2. Study plan and F.H.A./city-county codes

3. Use all necessary resource materials to obtain desired information.

B. 1. Complete Unit 6, Math Review. Submit for grading.

2. Complete Unit 6, Communication Terminology. Submit for grading. Be prepared for testing before Formal Summary.

C. In a written report, discuss the following:

1. F.H.A. and city-county codes pertaining to footings and foundations.

2. Discuss sizes of footings for various types of construction. Indicate type and size of footings for your plan.

3. Discuss sizes of foundations for various types of construction. Indicate type and size of foundation for your plan.

4. There are several methods used in the construction of footing and foundation forms. Two of the most common methods used in this area are on display in the classroom. Using scaled balsa wood construct a corner section of both of these types. Make each side of the cornice 16" in length.

5. There are various blockouts required in the foundation forms. Indicate what these are, sizes, and where located in relation to your plan.

6. Your plan indicates a particular type of subfloor construction. Various concrete pier blocks must be poured to support your subfloor. Indicate size, spacing, and number of pier blocks. Indicate size of fireplace footing and its location.

7. There is a difference between concrete and cement. Explain the difference.

8. There are several companies in this area that supply carpenters with redi-mix concrete. Name these companies.

9. From your plan, determine the number of cubic yards of concrete needed to pour footings, foundation walls, pier blocks and fireplace footing.

10. Anchor bolts and reinforcing rods are inserted into the wet concrete. Discuss size and placement of anchor bolts and placement of reinforcing rods.

11. Discuss form stripping method.

12. Upon completion, submit for grading.

D. 1. Install footings, foundation walls, pier blocks and fireplace footing on your platform. Construction must be precise and according to plan.

2. Upon completion, request evaluation by teacher.

E. 1. Upon completion of above Student Responsibilities, request Formal Summary. Complete and submit for grading.

FRANKLIN PIERCE HIGH SCHOOL

Unit Six: Communications Terminology

Name: _____

_____ CRAWL HOLE

_____ FOUNDATION

_____ BACKFILL

_____ CONCRETE

_____ FOOTING

_____ HOLLOW MASONRY

_____ STRIPPING

_____ ANCHOR BOLTS

_____ FOUNDATION FORMS

_____ BLOCKOUTS

_____ CEMENT

_____ REINFORCING ROD

_____ PIER BLOCK

_____ BRICK VENEER

1. THE SPREADING COURSE OR COURSES OF CONCRETE AT THE BASE OF FOUNDATION WALLS.
2. TWO SHEATHING OR PLYWOOD WALLS NAILED AND WIRED TOGETHER AND INTO WHICH CONCRETE IS POURED.
3. A DRY, POUDERY PRODUCT PRODUCED FROM LIMESTONE, SHALE, CLAY, AND MARL.
4. A MIXTURE OF CEMENT, SAND, GRAVEL AND WATER.
5. A BRICK WALL ATTACHED TO AN EXTERIOR WOOD WALL.
6. A BUILT-IN SPACE IN A FOUNDATION WALL THAT ALLOWS FOR ENTRANCE UNDER THE STRUCTURE.
7. A STEEL ROD THAT IS PLACED IN THE FOUNDATION TO SUPPORT PATIO'S AND PORCHES.
8. REMOVING THE FOUNDATION FORMS AFTER THE CONCRETE HAS SET.
9. BUILT IN SPACES IN FOUNDATIONS SUCH AS AIR VENTS AND CRAWL HOLES.
10. A 20" ROUND CONCRETE PAD USED TO SUPPORT SUBFLOOR POSTS.
11. STEEL BOLTS THAT ARE SECURED IN THE TOP OF THE FOUNDATION WALLS.
12. THE REPLACING OF SOIL AROUND THE FOUNDATION AFTER THE FORMS HAVE BEEN STRIPPED.
13. CEMENT BLOCK CONSTRUCTION OF FOUNDATIONS.
14. THE CONCRETE SUPPORTING PORTION OF A STRUCTURE BELOW THE FIRST-FLOOR CONSTRUCTION.

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T. I. P.

Unit Six: Math Review NAME: _____

Show your work on this paper.

1. Add 6'7", 12'8", 10'4", 14'9" _____

2. Add 20'11", 16'8½", 45'6 3/4", 43'7 5/8" _____

3. Multiply 22'7½" by 4 _____

4. Change 12'8" to feet _____

5. Change 6'3" to feet _____

6. (24" + 1 5/8") - (10" + 7½") _____

7. Multiply 12 x 6 x 8 _____

8. Multiply 3/4 x 4½ x 2 2/3 _____

9. Change 54' to yards _____

10. Change 18" to yards _____

11. Change 6" to yards _____

12. Change 65' to yards _____

13. Find the volume of a rectangular solid 8' x 12' x 3'.

14. Find the number of cubic yards in a rectangular solid 87' x 18" x 6".

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Footings and Foundations: Formal Summary NAME:_____

Directions: Listed below are pertinent terms and phrases dealt with in this unit. Discuss how each is important in the correct construction of footings and foundations.

1. F.H.A. and city-county codes:

2. Various footing and foundation sizes:

3. Blockouts required:

4. Concrete and cement (difference):

5. Anchor bolts and reinforcing rods:

6. Determine number of cubic yards of concrete needed for a standard footing and foundation that is 150' long:

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T. I. P.

UNIT SEVEN: Floor Framing

OBJECTIVE: Upon completion of this unit each student will have knowledge of various subfloor construction methods used in this area.

RESOURCE MATERIALS:

1. Textbook (Unit 7)
2. Classroom resource material
3. Resource Center
4. On-site construction through independent study

STUDENT RESPONSIBILITY:

A. 1. Read textbook unit

2. Study plans and F.H.A./city-county codes

3. Use all necessary resource materials to obtain desired information.

B. 1. Complete Unit 7 Math Review. Submit for grading.

2. Complete Unit 7 Communication Terminology. Submit for grading. Be prepared for testing before Formal Summary.

C. In a written report, discuss the following:

1. F.H.A. and city-county codes pertaining to materials used and methods of fastening mud sills to foundation walls.

2. Three different subfloor construction methods used in this area:

a. joist floors

b. beam and decking

c. beam and 2-4-1

Because of the lack of textbook material on these subfloor methods, you will receive the information via teacher lecture. Upon completion of the lecture, certain knowledge will be required of you prior to finishing this unit:

a. Joist Floors:

1. Discuss F.H.A. codes pertaining to floor joist spans, spacing, and installation.

2. Discuss support members under floor joists on excessive spans.

3. Discuss cross bridging and solid bridging.

4. Discuss framing procedures used when floor openings are required.

5. Discuss subfloor materials and methods used to lay and nail each.

b. Beam & Decking:
(If your plan uses a beam and decking subfloor, discuss these factors in relation to your plan.)

1. Discuss material sizes used in beam and decking construction.

2. Indicate knowledge of beam and post placement (include o.c. distances).

3. Discuss framing procedures used when plan calls for floor opening.

4. Discuss material used for subfloor covering. Explain how material is laid and nailed.

5. Determine number, length and cost of beams and posts needed for your model.

6. Determine board footage and cost of subfloor covering.

c. Beam & 2-4-1:
(If your plan calls for a beam and 2-4-1 subfloor, discuss these factors in relation to your plan.)

1. Discuss material sizes used in beam and 2-4-1 construction.

2. Indicate knowledge of beam and post placement (include o.c. distances).

3. Discuss material used for subfloor covering and explain how it is laid and nailed.

4. Figure total cost of beam and post materials.

5. Determine square footage and cost of subfloor covering.

3. Discuss operation and use of a pneumatic nailer.

4. Discuss F.H.A. codes pertaining to vapor barriers.

5. Upon completion, submit for grading.

D. 1. According to plan, install correct subfloor on your model. Pay particular attention to accuracy and quality construction.

2. Upon completion, request evaluation by teacher.

E. 1. Upon completion of above Student Responsibilities, request Formal Summary. Complete and submit for grading.

FRANKLIN PIERCE HIGH SCHOOL
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Unit Seven: Communications Terminology NAME:_____

_____ cross bridging	1. The flooring that is nailed to the floor joists or beams and over which the finished flooring is laid.
_____ mud sill	2. A 2" x 6" or 2" x 4" structural member that is bolted onto the foundation.
_____ beam and 2-4-1	3. 2" x 10" or 2" x 12" boards that are nailed to the mud sill or on girders and are the supports for flooring.
_____ subfloor	4. The length of the joist from one anchor point to another anchor point.
_____ solid bridging	5. Short 1" x 4" boards that are paired in an X fashion between floor joists to level the joists and make them rigid.
_____ vapor barrier	6. A type of flooring in which 4" x 8" beams are supported on pier blocks and posts and T & G cardecking is laid over the beams to make the sub-flooring.
_____ joists	7. Boards that are nailed between floor joists over the girder and hold the joists in a vertical position.
_____ girders	8. An air-powered nailer that drives nails under pressure.
_____ beam and decking	9. A plastic sheet that is laid on the ground under the subflooring to prevent moisture from being absorbed by the subflooring.
_____ pneumatic nailer	10. A center beam that is the mail support for the subflooring and the joists are nailed to it at 16" O. C.
_____ joist span	11. A subfloor type that uses several beams and a 1 1/8" T & G plywood subfloor.

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UNIT SEVEN: Math Review NAME:_____

1. Add 15' 8½", 16' 4 3/4", 28' 9", 12' 3 1/8"

2. Divide 728 by 2

3. Divide 672 by 16

4. Divide 56 by 4/3

5. (24 + 1 5/8) - (10 + 7½) =

6. Multiply 56 x 24

7. Multiply 72' 6" by 27'

8. Multiply 1.73 x $135

9. Find cost of 2,450 bd. ft. lumber at $150 per M

10. Find area of rectangle with dimensions $56\frac{0}{-}$ x $26\frac{6}{-}$

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Floor Framing: Formal Summary NAME:_____

Directions: Listed below are pertinent terms and phrases dealt with in this unit. Discuss how each is important in the correct construction of various subfloors.

1. F.H.A. codes pertaining to mud sills:

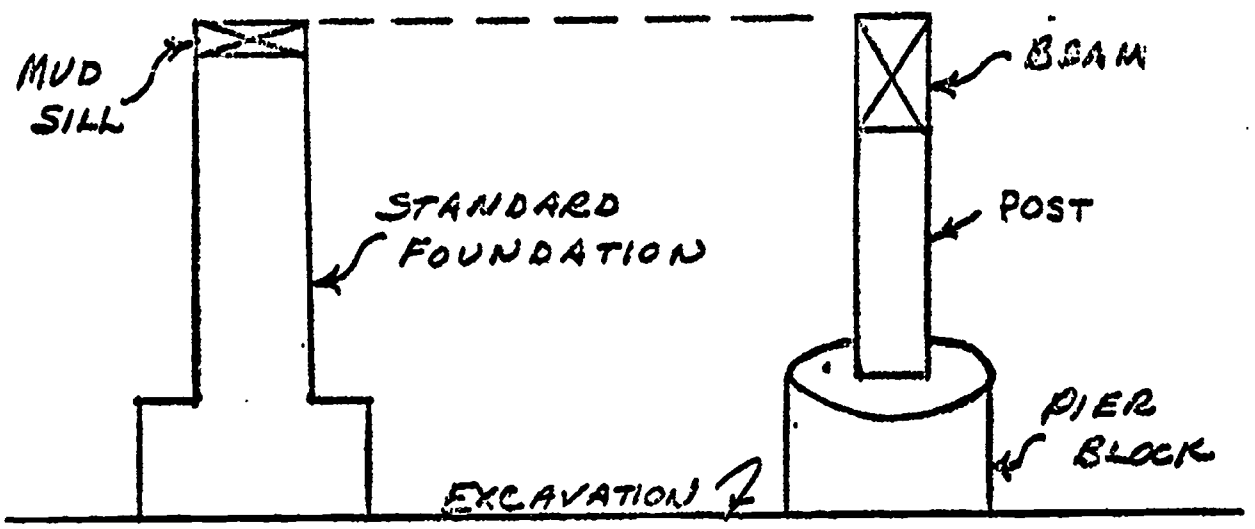
2. Joist floors and where used:

Formal Summary continued

3. Beam and decking and beam and 2-4-1 (difference):

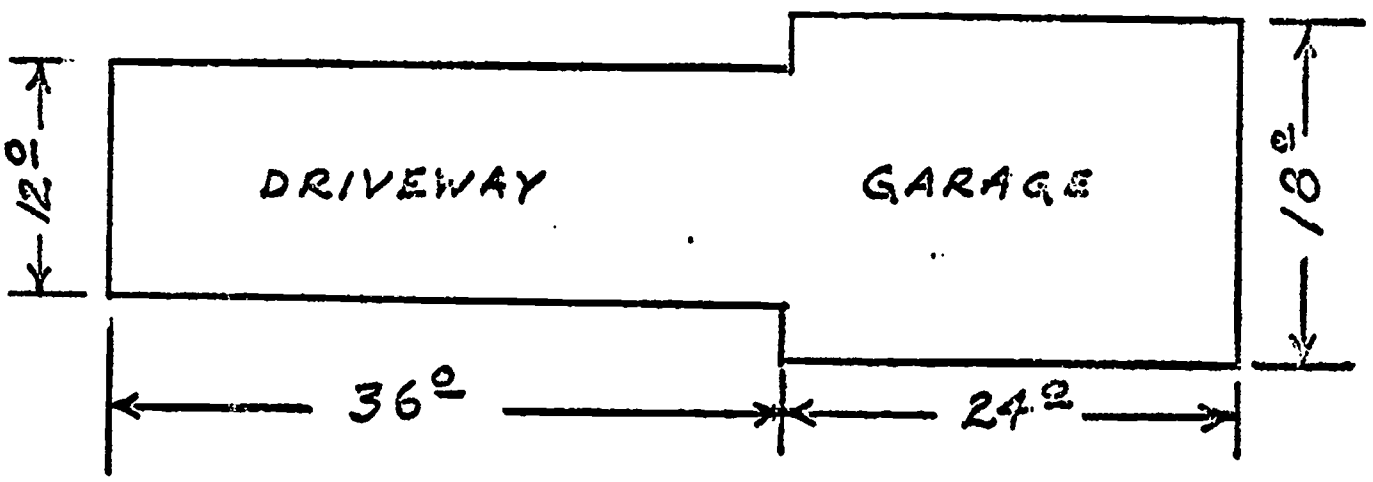
4. Vapor barriers:

5. Discuss method of finding length of posts for subfloor construction:



Formal Summary continued

6. A 4" concrete slab is to be poured for the garage and driveway shown in the drawing. Write up an order list of materials needed for the forms and determine how much concrete to order.



Formal Summary continued

7. Using the foundation plan furnished by the instructor and the dimensions given, find each of the following:

   a. Lineal feet of 2" x 6" for footing forms:_____

   b. Number cubic yards concrete needed for standard 24" foundation (footing and wall):_____

   c. Number of pier blocks needed for beam and decking floor:_____

   d. Cubic yards of concrete for pier blocks:_____

   e. Number of posts needed for beam and deck floor:_____

   f. Lineal feet of posts needed:_____

   g. Lineal feet of beams:_____

      Board feet of beams:_____

   h. Lineal feet of mud sill:_____

   i. How many square feet of plywood are needed for subfloor?_____

   j. Cubic yards of concrete for garage floor:_____

UNIT 8: DECIMAL FRACTIONS

OBJECTIVES: Upon completion of this unit the student will have demonstrated the ability to:

A. Read and write decimal fractions to hundred-thousandths

B. Determine which of two decimal numbers is larger or smaller

C. Change from decimal fractions to common fractions

D. Change from common fractions to decimal fractions

E. Add, subtract, multiply and divide decimal fractions

F. Apply the above objectives to "word problems"

METHOD: The student will be given a teacher-made pre-test covering the stated objectives. If he passes the pre-test with a score of 95% or better, he will move into the next unit. If he fails to achieve 95% on the pre-test, the teacher will prescribe a list of assignments to meet his particular weaknesses. When the student has completed and checked the assignments in his prescription, he will take a teacher-made post-test covering the unit objectives. He must score 80% or better in order to continue to the next unit. If he fails to achieve at this level, a new prescription will be written and upon completion a second post-test will be given. If he again falls below 80%, a third prescription is given and upon completion a third post-test for which 70% accuracy is required.

RESOURCES: 1. Vocational and Technical Mathematics in Action - Samuel Levine; Heyden Book Company, 1969.

T. I. P.

MATHEMATICS

UNIT 8: Decimal Fractions NAME:_____

PRE-TEST

1. Write 15 thousandths as a decimal. _____

2. Which of the following is the way you would read .06?

   a) six-tenths b) six c) six-thousandths d) six-hundredths

3. Rearrange the numbers in the next two problems so that the largest number is first and the smallest is last.

   a) .7 .007 .08 b) .043 .23 .3

4. Change .9 to a common fraction. _____

5. Change 1/8 to a decimal. Leave the remainder as a common fraction after second decimal place.

   _____

6. .7 + .8 + .9 = _____ 7. $5.76 + $25.00 + $.49 = _____

8. $73.80 - $7.17 = _____

9. Take $8.11 from $10.00. The remainder is_____.

10. $5.47 x 10 = _____ 11. .35 ÷ 10 = _____

Place the decimal point correctly in the answers to the following problems. Add any zeros that may be needed.

12. .06 x .9 = 54 13. $3.75 x .6 = $2 2 5 0

14. $25\overline{)9.25}$ = 37

7 5
1 75
1 75

15. $25\overline{).925}$ = 37

75
175
175

16. $.25\overline{)925}$ = 37

75
175
175

17. $2.5\overline{)9.25}$ = 37

7 5
1 75
1 75

18. A piston has a diameter of 3.0625 ± 0.0015". Find the largest and smallest diameters that are acceptable. What is the total tolerance?

19. Round off the following numbers:

a) 26.435 to the nearest whole number. _____

b) 93.0219 to the nearest thousandth. _____

c) 145.2615 to the nearest hundredth. _____

d) 4.0627 to the nearest tenth. _____

e) 0.0000258 to the nearest ten-thousandth. _____

20. $27.93 \times 0.07 =$ _____

21. $61.572 \div 1.2 =$ _____

22. A carpenter charges $6.25 per hour for repairing a wood floor. He starts work at 8:20 a.m. and completes the job at 1:50 p.m. He also charges the cost of the materials, which amounts to $15.65. What is the total cost of the job?

23. In order to put the finishing touches on the construction of a moon probe in time for a sheduled launching, a special machinist worked five 8-hour days at regular wages of $5.50 per hour. He then worked 8 hours on Saturday at time and one-half. In order to complete the rush job, he also worked 6 hours on Sunday at double time pay. What are his total wages for the week? If his total tax deduction was $63.42, what was his take home pay for the week?

24. A contractor paid $1,906.42 for framing material and trim, $65.50 for hardware, $462. for masonry, $170.35 for painting, and the cost of his own labor was $850.67. What was the total cost of the items listed?

25. The estimate for interior finish was as follows: Doors, $162.78; windows, $97.22; casement sash, $26.38; interior trim, $84.73; shelves, $27.69; drawer stock, $18.52. When the job was completed, the contractor received a credit of $14.27 on the doors, $3.25 on the sash, $6.29 on the trim. He ordered more shelving that cost him $6.26 and a light of glass to replace a broken one at a cost of $3.75. What was the net amount of the bill?

T. I. P.

MATHEMATICS

UNIT 8: Decimal Fractions NAME:_____

Assignments

Text: Vocational and Technical Mathematics in Action

Concept		
Place Value	1.	Read pages 35-36 Do problems 1, 2, 5; page 36
Add, Subtract, Compare	2.	Read pages 37-38 Do problems 1-10, 14, 17, 19, 23; pages 38-39
Tolerance	3.	Read pages 40-42 Do problems 1-5; page 42
Rounding Off	4.	Read pages 43-44 Do problems 3, 4, 5; page 44
Multiplication	5.	Read page 45 Do problems 1-16; page 45
Division	6.	Read pages 49-51 Do problems 1-9, 11; page 51
Multiplying, Dividing by Powers of 10	7.	Read pages 51-53 Do problems 1-10; page 52 Do problems 1-20; page 53
Decimals to Fractions	8.	Read pages 53-54 Do problems 5-12; page 54
Fractions to Decimals	9.	Read pages 54-55 Do problems 1-4, 8; page 55
Decimal-Fraction Table	10.	Read pages 55-56 Do exercises 1-7, 10; page 56
Time-Wages	11.	Read pages 64-66 Do problems 1-5; page 67
Review	12.	Problems 1-5, 7-11; pages 67-68
	13.	Test

MATHEMATICS

UNIT 8

NAME: _____

Assignment	1	2	3	4	5	6	7	8	9	10	11	12	Test
Number of Problems	13	23	5	14	16	10	30	8	5	8	9	34	
Number Correct													
Date Finished													

T. I. P.

MATHEMATICS

UNIT 8: Decimals NAME: _____

POST-TEST 1

1. Write 4 and 45 thousandths as a decimal numeral. _____

   Write six hundredths as a decimal numeral. _____

2. Rearrange the numbers in the next two problems so that the largest number is first and the smallest is last.

   a) .34 .034 .345 3.45 b) .035 .3 .35

3. Change .125 to a common fraction reduced to lowest terms. _____

4. Change 5/8 to a decimal. Leave the remainder as a common fraction after the second decimal place. _____

5. 3.2 + .45 + 4.5 = _____ 6. $4.98 + $15.50 + $6.95 + $.49 = _____

7. $48.50 - $19.95 = _____

8. Take $6.19 from $20.00. The remainder is _____.

9. $65.54 x 100 = _____ 10. 4.25 x 10 = _____

Place the decimal point correctly in the answers to the following problems. Add any zeros that may be needed.

11. 10.65 x .06 = 6390 12. 4.50 x .5 = 2250

13.
$$12\overline{)14.88} = 1.24$$
12
28
24
48
48

14.
$$1.2\overline{)1488} = 124$$
12
28
24
48
48

Place the decimal point correctly in the answers to the following problems. Add any zeros that may be needed.

15.
$$12 \overline{)\ .1488} = 124$$

12
28
24
48
48

16.
$$.12 \overline{)\ 148.8} = 12\,4$$

12
28
24
48
48

17. A part is machined on a lathe to the following specifications:
length 6.25" $\pm$ .005, diameter .875 + .005, -.002.
Give upper and lower limits for the length and the diameter; also give the total tolerances of each.

T. I. P.

MATHEMATICS

UNIT 8: Decimals NAME: _____

POST-TEST 2

1. Write 3 and 45 thousandths in decimal form. _____

2. Arrange in order of size from smaller to larger:

   .009 .15 .01 .090 .115

3. Write as decimals and add.

   3 thousandths, 4 and 75 thousandths, 175 thousandths

4. $76.55 + $15 + $45.28 = _____

5. $47.20 - $19.56 = _____

6. $20 - $7.43 = _____

7. Locate the decimal point correctly, adding any zeros that may be needed.

   a) .16 x .3 = 48

   b) 3.2 x 16 = 416

   c) $.04\overline{)19.4}$ = 485

   d) $12\overline{)4.92}$ = 41

   e) $2.1\overline{)22.47}$ = 107

   f) $.08\overline{)492}$ = 615

8. The rainfall in New City for a four month period was as follows: September - 3.15 inches; October - 5.38 inches; November - 2.5 inches; December - 1.86 inches. What was the total rainfall during this period? The average rainfall for this period is 12.68 inches. Is this above or below the average and by how much?

9. The Corner Drug Store cash register contained $513.43. The cashier added $11.28, $7.11, and $3.26 to what was there, then removed $400 to deposit in the bank. How much was left in the register?

10. John agreed to pay for a cycle costing $228 by paying $30 and the balance in equal monthly installments for 12 months. How much did he pay each month?

11. The cost of purchasing and laying 21 squares of asphalt shingles was $242.75. Figure the cost per square.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

UNIT EIGHT: Lay Plates & Frame Building

OBJECTIVE: Upon completion of this unit, each student will have knowledge of and experience in laying out plates and framing interior and exterior walls.

RESOURCE MATERIALS:

1. Textbook (Unit 8)
2. Classroom resource materials
3. Resource Center
4. On-site construction through independent study

STUDENT RESPONSIBILITY:

A. 1. Read and study all resource materials available.

2. Refer to model plan and F.H.A. codes.

B. 1. Complete Unit 8 Math Review. Submit for grading.

2. Complete Unit 8 Communication Terminology. Submit for grading. Be prepared for testing before Formal Summary.

C. In a written report, discuss the following:

1. F.H.A. and city/county codes pertaining to wall framing members.

2. Define exterior wall, bearing wall, and partitions.

3. Define sole plates, top plates, studs, cripples, trimmers, header, rough sill, and double top plate.

4. There are two types of wall framing used. Name and explain their difference.

5. Discuss plate layout. Keep in mind F.H.A. regulations and header positions.

6. Header length depends on the object to be placed in the rough opening. To the best of your ability, figure header sizes for various openings on your plan. (Refer to Supplementary page A.)

7. Outside and inside corners require a specific type construction. Discuss.

8. Wall intersections require a specific type construction. Discuss.

9. Briefly discuss how you would construct one exterior wall. Begin with laying of plate to raising of wall.

10. Explain use of double plate.

11. Explain nailing procedures used to fasten all wall framing members. Include nail sizes.

12. Determine number of board feet of material needed to frame all walls of your construction model. Also figure cost of these various construction materials (plates, studs, headers, cripples, trimmers, rough sills, and top plates).

13. Upon completion, submit for grading.

D. 1. Lay plates and frame exterior, bearing, and partition walls on your model platform. Accuracy must be maintained in order to complete task correctly.

2. Upon completion, request evaluation by teacher.

E. 1. Upon completion of above Student Responsibilities, request Formal Summary. Complete and submit for grading.

SUPPLEMENTARY A

HOW TO DETERMINE HEADER LENGTHS

In the Tacoma area, headers for door and window openings are usually 4" x 8" Douglas fir.

Header lengths are determined by the doors or windows that are to be installed in the rough opening. In this area, most doors and windows are standardized. By applying the following information correctly, you should be able to compute header lengths for any given door or window.

Swinging Doors: Bedroom

Door	=	2'-6"
2 Trimmers	=	3¼"
Jambs	=	1½"
Clearance	=	1"
Total		2'-11 3/4" or 35 3/4" or 5 3/4" larger than door size

Window and Sliding Glass Doors:

Window	=	6'-0"
2 Trimmers	=	3¼"
Total		6'-3¼" or 75¼" or 3¼" larger than window size

Overhead Garage Doors:

Door	=	16'-0"
4 Trimmers	=	6½"
Jambs	=	3¼" (2x6 material)
Clearance	=	1"
Total		16'-10 3/4" or 10 3/4" larger than door size

Sliding Wardrobe Doors:

2 Doors	=	4'-0"
2 Trimmers	=	3¼"
Total		4'-3¼" or 51¼" or 3¼" larger than door size

Supplementary A continued

Bi-Fold Doors:

2 Sets of Doors	=	4'-0"
2 Trimmers	=	3¼"
Jambs	=	1½"
Clearance	=	1"
Total		4'-5 3/4" or 53 3/4" or 5 3/4" larger than size of doors

Pocket Doors:

Door Size x 2	=	5'-0"
2 Trimmers	=	3¼"
Jambs	=	1½"
Clearance	=	1"
Total		5'-5 3/4" or 65 3/4" or 5 3/4" larger than two times door size

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Unit Eight: Communications Terminology

____ non-bearing partition
____ rough sill
____ plumb
____ cripple
____ backing
____ top plate
____ header
____ sheetrock
____ on-center
____ soffit
____ wall sheathing
____ rough opening
____ bearing partition
____ double top plate
____ lay-out
____ brace
____ sole plate
____ trimmer
____ full stud

1. A horizontal member located at the base of a partition or other frame.
2. A gypsum product that is made in large rigid sheets and is fastened to the frame of a building to provide surface finish.
3. The opening formed by the framing members.
4. Horizontal framing member that supports the load over an opening.
5. Horizontal framing member attached to the top plate which gives a nailing surface for gypsum wallboard.
6. Exactly perpendicular or vertical; at right angles to the horizon or floor.
7. A horizontal member placed on top of the studs to support the roof load.
8. To stiffen or make steady in a horizontal or vertical position.
9. A vertical member that reaches from sole plate to top plate.
10. A structural covering of boards or prefabricated panels that are attached to the exterior studding of a structure.
11. The underside of the members of a building, such as overhangs.
12. A horizontal member whose primary purpose is to tie all exterior and interior walls together.
13. A partition that supports the ceiling or roof.
14. A vertical framing member that is terminated at the rough sill.
15. A vertical framing member that is terminated at the header of a rough opening.

16. The lowest horizontal member of a window rough opening.

17. A partition that simply encloses space and provides a framework for wall-covering materials.

18. A method of indicating the spacing of framing members.

19. Marking of plates to indicate placement of studs, headers, cripples, corners and intersections.

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Unit Eight: Math Review - Fractions NAME: _____

Show your work on this paper.

1. Add 1/2, 1/16, 3/4, 5/8 _____

2. Subtract 9/16 from 3/4 _____

3. Change 3/8" to sixteenths _____

4. Change 12/16 to fourths _____

5. Change 3/4' to inches _____

6. Add 3/4" and 3/4" _____

7. Change 10" to a fractional foot _____

8. Add 1 1/2", 5/4", 9/8", 1 5/8" _____

9. Add 1 5/8" and 1 5/8" _____

10. Subtract 9/4" from 2 5/16" _____

11. Change 1¼' to feet and inches _____

12. Add 3½", 4 5/16", 2 1/8", 3 3/4" _____

Math Review continued

13. Subtract 8 25/32" from 10 3/4" _____

14. Add 1 5/8, 1 5/8, 1 5/8 _____

15. Change 3 5/8' to inches _____

16. Change 21" to feet _____

17. Change 3 3/4 doz. to number of pieces _____

18. Add 2' 2½", 5' 6 3/4", 8' 9 5/16" _____

19. Subtract 5' 3 1/8" from 10' 2 9/16" _____

20. Multiply 1 5/8" by 2 _____

21. Multiply 5' 2 3/8" by 24 _____

22. Divide 18' 6½" by 4 _____

23. Divide 3¼" by 2 _____

24. Add 1 5/8" and 1 5/8" _____

25. Subtract 7½" from 88 5/8" _____

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Lay Plates and Frame Building: Formal Summary NAME:_____

Directions: Listed below are pertinent terms and phrases dealt with in this unit. Discuss how each is important in the correct and accurate construction of all interior and exterior walls.

1. F.H.A., city/county codes:

2. Parts of the wall frame (define each part):

3. Corner and wall intersection construction:

4. Header size and lengths:

5. Frame wall:

FRAMING

6. Determine the number of board feet in each of the following.

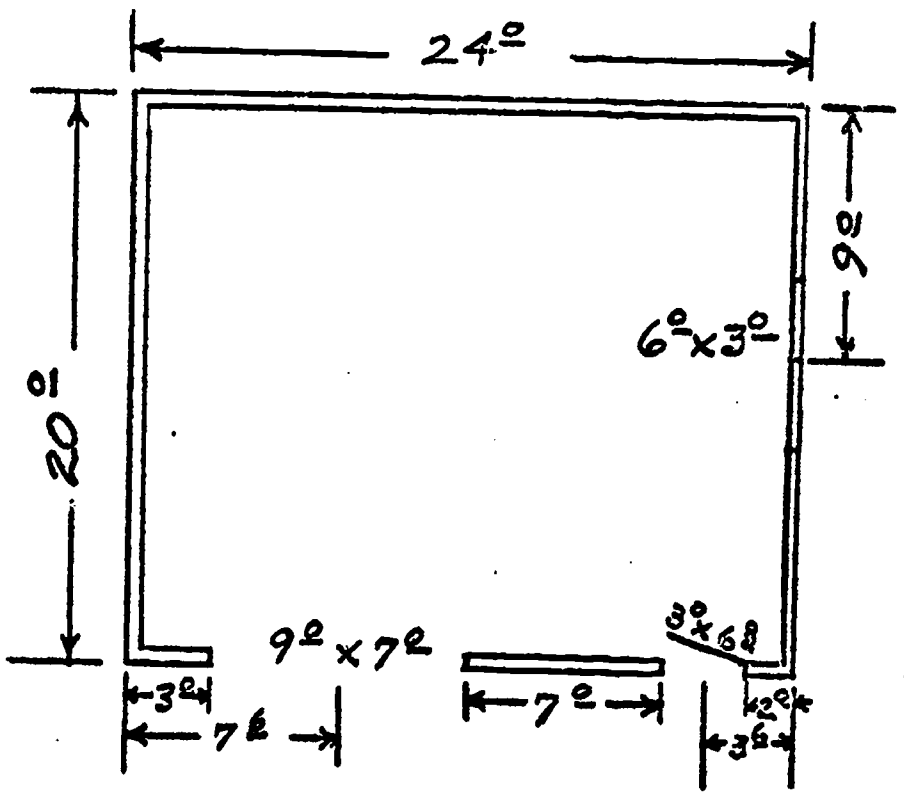
   a. 14 pc. 2" x 4" x 16'

   b. 180 lineal feet 1" x 4"

   c. 45 joists 2" x 6" x 14'

   d. 10 - 4" x 8" beams 16' long

7. For the garage drawn here:



a. Find the lineal feet of plates: _____

b. Find the number of board feet in the plates: _____

c. Find the exact number of studs needed for walls, cripples and corners:
_____

d. Find the lengths of each of the three headers in the garage:

Door_____ Window_____ Garage Door_____

e. Find the cost of the plates and studs if 2" x 4" are sold for $135 per M: _____

UNIT 9: PERCENT

OBJECTIVES: Upon completion of this unit the student will have demonstrated the ability to:

A. Recognize a percent for what it is.

B. Change from one form of a number to an equivalent form. (percent-decimal-fraction)

C. Use percents in solving "word problems".

METHOD: The student will be given a teacher-made pre-test covering the stated objectives. If he passes the pre-test with a score of 95% or better, he will move into the next unit. If he fails to achieve 95% on the pre-test, the teacher will prescribe a list of assignments to meet his particular weaknesses. When the student has completed and checked the assignments in his prescription, he will take a teacher-made post-test covering the unit objectives. He must score 80% or better in order to continue to the next unit. If he fails to achieve at this level, a new prescription will be written and upon completion a second post-test will be given. If he again falls below 80%, a third prescription is given and upon completion a third post-test for which 70% accuracy is required.

RESOURCES:
1. Vocational and Technical Mathematics in Action - Samuel Levine; Hayden Book Company, 1969.
2. Practical Problems in Mathematics - Carpentry Trades; Delmar Publishers, Inc., 1962.
3. General Mathematics - Kinney, Ruble, Blythe; Holt, Rinehart & Winston, Inc., 1960.

T. I. P.

MATHEMATICS

UNIT 9: Percent

NAME:_____

PRE-TEST

1. The word "percent" means:_____

Change each term to equivalent terms as fractions, decimals and percents.

	FRACTIONS	DECIMAL	PERCENT
2.	1/4	_____	_____
3.	_____	.35	_____
4.	7/100	_____	_____
5.	_____	_____	16%
6.	_____	.125	_____
7.	_____	_____	8½%
8.	_____	_____	150%
9.	5/4	_____	_____

10. What percent of his annual income of $6,600 does a man save if he deposits $20 a month into a savings account?

11. Two months ago Joe received a 10% raise on his $90 weekly salary. This week his salary was reduced 10%. How does his present salary compare with his original salary before the increase?

12. Dick's father bought a new car for $3,060. He paid 20% down. If the balance is paid in 24 months and his finance charges are 8% per year, how much interest does he pay? What are his monthly payments?

Pre-Test continued

13. The total area to be covered by insulation is 1,250 square feet. How much insulation should be ordered if 8% is allowed for waste?

14. For a residence, 2% of the total cost was figured for excavation. How much money should be allowed for this part of the work, if the house cost $6,890?

15. A contractor borrowed the sum of $9,975. If the bank charged 5½% interest, how much money did he pay in interest?

16. A carpenter obtains a price on storm windows of $2.91 each. How much must he pay for 12 windows if he gets a wholesale discount of 5% and a cash discount of 2%?

T. I. P.

MATHEMATICS

UNIT 9: Percent

NAME:_____

Assignments

Texts: (1) Vocational and Technical Mathematics in Action
(2) Practical Problems in Mathematics - Carpentry Trades
(3) Holt General Mathematics

Concepts

Meaning and Changing	1.	(1) Read pages 69-71 Do problems 1-6, 9-12, 14; page 71
Meaning and Changing	2.	(3) Read page 178 Do problems 1-10
Using	3.	(1) Read page 73 Do problems 1, 2, 3, 6, 7, 8; pages 73-74
Percent to Decimal	4.	(3) Page 185 Do problems 1-3, 5, 9-12, 15-19; page 185
Decimal to Percent	5.	(3) Page 185 Do problems 1-10, 19-24; page 185
Fraction to Percent	6.	(3) Page 186 Do problems 1, 2, 4, 6, 9, 12, 15; page 186
Percent to Fraction	7.	(3) Page 187 Do problems 1-6, 10-14; page 187
Using	8.	(1) Study pages 78-81 Do problems 1, 2, 3, 8, 12; page 81
Using	9.	(1) Study summary page 82 Do problems 1, 2, 6, 7, 8; page 82
Using	10.	(2) Page 46-49 Do problems 2, 6, 13, 20, 28, 30, 41
Using	11.	(2) Pages 50-51 Do problems 1, 2, 5, 10, 14
Using	12.	(2) Page 52 Do problems 2, 3, 6, 14, 16, 31, 36, 37, 38
	13.	Test

Unit 9: Percent

NAME:_____

Assignment	1	2	3	4	5	6	7	8	9	10	11	12	Test
Number of Problems													
Number Correct													
Date Finished													

T. I. P.

MATHEMATICS

UNIT 9: Percent

NAME: _____

POST-TEST 1

1. Write the equivalent of each given term.

	FRACTION	DECIMAL	PERCENT
a.	_____	.15	_____
b.	_____	_____	31%
c.	3/4	_____	_____
d.	_____	1.25	_____
e.	_____	_____	7½%
f.	5/8	_____	_____

2. 12% of $742 = _____

3. $16 is _____% of $80.

4. _____% of 380 is 19

5. 68 is 50% of _____

6. 96 is _____% of 24

7. A jet transport flies about 550 mph. A propeller driven transport flies about 60% of that speed. What is the speed of the propeller driven plane?

8. After making a down payment on a car, Joe has a $700 balance to pay. When he finished making payments on the car, he had paid $805 more than the down payment. What was the amount of interest he paid and what percent interest did he pay?

9. Dick's father bought a new car for $3,060. He paid 20% down. If the balance is paid in 24 months and his finance charges are 8% per year, how much interest does he pay? What are his monthly payments?

10. How many square feet of sheathing are to be ordered if the area of the roof is 2,550 sq. ft. and 20% is allowed for waste?

11. A contractor figures a job to cost $15,000. If he allows 12% for profit, what should be bid for the job?

12. A hardware company adds 3½% to bills that are not paid within a 30 day period. If a carpenter is unable to pay his bill of $70.80 until after the 30 days, what was the total charge of the bill?

13. The dealer's price to a contractor on a bill of materials is 12½% off list price, with an additional 2% discount for cash within 30 days. Find the total discount and net price on a $1,975 order.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.
MATHEMATICS

Unit Nine: Percent
POST-TEST 2

1. Write the equivalent of each given term:

	FRACTION	DECIMAL	PERCENT
a)	1/4	_____	_____
b)	_____	.35	_____
c)	_____	_____	64%
d)	1/8	_____	_____

2. 15% of $148.00 = _____

3. $31 is _____% of $124.00

4. _____% of 450 is 18.

5. 37 1/2% of $164.00 = _____

6. A meat inspector tested a 4 ounce sample of hamburger and found it to contain 1.3 ounces of fat. What was the percentage of fat in the meat?

7. How much is saved by buying a $30 tire at a reduction of 30%? What is the sale price of the tire?

8. A carpenter finds that storm windows list for $12.95 each. How much will it cost him for 12 windows if he gets a 5% discount for being a contractor? By paying cash he gets an additional discount of 2%. What would be his price if he pays cash for 12 windows?

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T. I. P.

UNIT NINE: Leveling, Aligning & Installing Exterior Sheathing

OBJECTIVE: Upon completion of this unit, each student will have knowledge of and experience in leveling, aligning, and applying exterior sheathing to a building.

RESOURCE MATERIALS:

1. Textbook (Unit 8)
2. Classroom resource materials
3. Resource Center
4. On-site construction through independent study

STUDENT RESPONSIBILITY:

A. 1. Read unit in textbook.

2. Study F.H.A. and city/county codes pertaining to this unit.

B. Complete Unit 9 Communication Terminology. Submit for grading. Be prepared for testing before Formal Summary.

C. In a written report, discuss the following:

1. Prior to installing exterior sheathing to a framed building, an operation must be performed. Discuss it.

2. F.H.A. and city/county codes pertaining to wall sheathing.

3. Determine number of sheets and total cost of exterior sheathing material required for your plan.

4. Upon completion, submit for grading.

D. 1. Level and align building. Install exterior sheathing.

2. Upon completion, request evaluation by teacher.

E. 1. Upon completion of above Student Responsibilities, request Formal Summary. Complete and submit for grading.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Unit Nine: Communications Terminology NAME:_____

_____ fiberboard

_____ plywood

_____ level

_____ straightedge

_____ pneumatic nailer

_____ gypsum sheathing

_____ shiplap

_____ align

1. A straight strip of wood or metal used to lay out or check the accuracy of work.
2. A gypsum product fastened to the exterior frame of a building.
3. A product made from wood fibers with added weather-proofing ingredients.
4. A wood product made by gluing together various layers at right angles to each other. Used extensively in this area for sheathing.
5. The process of bringing the framed structure to a perfect vertical position.
6. The process of making each exterior wall of the framed structure perfectly straight from corner to corner.
7. An air powered machine used to secure sheathing that is generally applied at a 45^{0} angle to the framed structure.
8. A solid wood board used for exterior sheathing that is generally applied at a 45^{0} angle to the framed structure.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

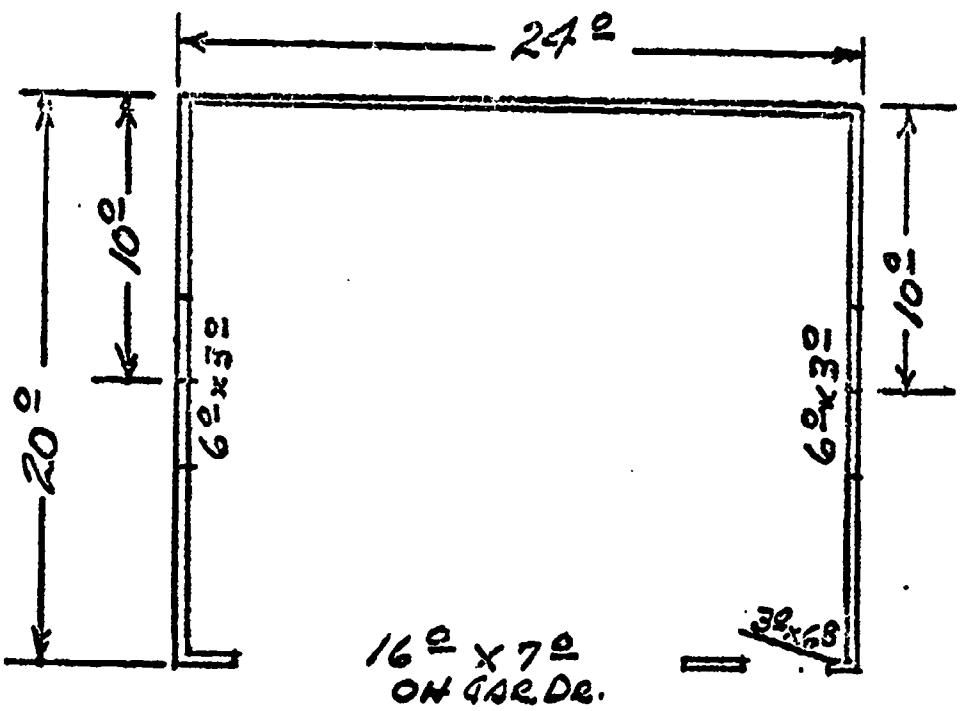
Level, Align and Sheath Building: Formal Summary NAME:_____

Directions: Listed below are pertinent terms and phrases dealt with in this unit. Discuss how each is important in the correct construction of your building.

1. Level and align building:

2. F.H.A. and city/county codes:

3. Determine the amount and type of material needed for the exterior sheathing of this garage: (wall height - 8')



FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

UNIT TEN: Ceiling Joists and Backing

OBJECTIVE: Upon completion of this unit, each student will have knowledge and experience in placement of ceiling joists and backing.

RESOURCE MATERIALS:

1. Textbook (Unit 8)
2. Classroom resource materials
3. Resource Center
4. On-site construction through independent study

STUDENT RESPONSIBILITY:

A. 1. Read unit in textbook.

2. Utilize all resource materials including F.H.A. and city/county codes.

B. Complete Unit 10 Communication Terminology. Submit for grading. Be prepared for testing before Formal Summary.

C. In a written report, discuss the following:

1. F.H.A. and city/county codes pertaining to ceiling joists and backing.
2. Ceiling joist spacing (keep in mind F.H.A. codes).
3. Joist size in relation to span.
4. Joist placement in relation to construction model. (Draw aerial view of model showing position of joists.)
5. Purpose and types of headers used in construction with ceiling joists.
6. Describe purpose for and types of cuts made on ceiling joists.
7. Joist nailing procedures. Include nail sizes.
8. Required number and length of joists needed for your model. Also determine cost of these joists.
9. Why backing is necessary.
10. Material size and placement of backing.
11. Upon completion, submit for grading.

D. 1. Install ceiling joists and backing on your model. Accuracy in this task is important to maintain quality construction.

2. Upon completion, request evaluation by teacher.

E. 1. Upon completion of above Student Responsibilities, request Formal Summary. Complete and submit for grading.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Unit Ten: Communications Terminology NAME: _____

_____ 16" o.c.

_____ joist layout

_____ joist hanger

_____ flush beam

_____ span

_____ access hole

_____ trim cutting

_____ shoe

_____ toe nailing

_____ ceiling joist

1. The process of cutting the ceiling joists to match the slope of the roof.
2. The F.H.A. prescribed process to insure that every other rafter ties to a ceiling joist.
3. A nailing process that enables structural members to be fastened on edge.
4. A horizontal structural member that supports the ceiling loads.
5. A double structural member necessary to keep joists aligned.
6. The distance between structural supports.
7. A heavy structural member used to reduce the span of a room.
8. The on-center distance required for ceiling joist layout
9. An opening in the ceiling frame that provides entrance to the attic area.
10. Metal device used to fasten joists to a flush beam.

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T. I. P.

Ceiling Joist and Backing: Formal Summary NAME:_____

Directions: Listed below are pertinent terms and phrases dealt with in this unit. Discuss how each is important in the correct installation of ceiling joists and backing.

1. F.H.A. and city/county codes:

2. Joist size in relation to span:

3. Header types and locations:

4. Backing materials and placement:

5. Determine the number of ceiling joists needed for a 16' x 24' garage:

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T. I. P.

UNIT ELEVEN: Rafter and Roof Framing

OBJECTIVE: Upon completion of this unit, each student will have knowledge of and experience in installation of roof framing members.

RESOURCE MATERIALS:

1. Textbook (Unit 9)
2. Classroom resource materials
3. Resource Center
4. On-site construction through independent study

STUDENT RESPONSIBILITY:

A. 1. Read and study textbook, plans and F.H.A., city/county codes.

2. Utilize all available resource materials for roof framing information.

3. In order to lay out rafters to the 1"=1'-0" scale of your models, it is necessary to make a scaled framing square. Do this on a piece of cardboard. Accuracy is vital.

B. 1. Complete Unit Eleven, Math Review. Submit for grading.

2. Complete Unit Eleven, Communication Terminology. Submit for grading. Be prepared for testing before Formal Summary.

C. In a written report, discuss the following:

1. F.H.A. codes pertaining to rafter spacing.
2. From your plan, determine roof type and pitch. Draw aerial sketch of rafter placement.
3. F.H.A. and city/county codes pertaining to rafter material size in relation to span.
4. Learn and demonstrate necessary terminology in order to understand roof framing.
5. Become thoroughly familiar with the rafter framing square.
6. Describe method of laying out and cutting the following:

a. common rafter

b. hip rafter

c. valley rafter

d. hip jack rafter

7. Determine number, length and cost of roof framing materials for your particular model.

8. Describe gable end construction.

9. Upon completion, submit for grading.

D. 1. Install roof framing members on your model. Maintain accuracy for quality construction.

2. Upon completion, request evaluation by teacher.

E. 1. Upon completion of above Student Responsibilities, request Formal Summary. Complete and submit for grading.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Unit Eleven: Communications Terminology NAME:_____

_____ seat cut

_____ total rise

_____ ridge

_____ hip rafter

_____ shingles

_____ kicker

_____ cornice

_____ collar beams

_____ cripple-jack rafter

_____ valley rafter

_____ rafter spacing

_____ gable roof

_____ common rafter

_____ hip roof

_____ hip-jack rafter

_____ tail cut

_____ total run

_____ mansard roof

_____ jack rafter

_____ pitch

_____ valley-jack rafter

_____ gambrel roof

_____ dormers

_____ facia

1. A variation of the gable roof where each slope is broken, usually near the center.
2. A rafter that runs at right angles from the wall plate to the ridge.
3. The incline of the roof as a ratio of the vertical rise to the span.
4. A wood member used for the outer face of a box cornice where it is nailed to the ends of the rafters and lookouts.
5. A projecting structure built out from a sloping roof. Usually includes one or more windows.
6. A roof which is flat or which is pitched only enough to provide for drainage.
7. The on-center distance at which rafters are secured to the structure.
8. A rafter that is the same as the upper end of a common rafter but intersects a valley rafter instead of the plate.
9. A roof that has two identical surfaces that slope from the center line of the structure.
10. The upper most structural member of a roof. Usually found in the center and is used to fasten rafters to.
11. The total distance between structural supports, such as walls, that rafters have to cover.
12. A rafter that is the same as the lower part of a common rafter but intersects a hip rafter instead of the ridge.
13. A roof that is similar to the hip roof except that each of the four sides has a double slope.

____ tail rafter

____ purlin

____ pre-built truss

____ flat roof

____ rafter span

14. A roof covering. Can be made of asphalt or wood.

15. Horizontal roof members used to support rafters between the plate and ridge board.

16. The horizontal distance each common rafter travels. Usually one-half the span.

17. A short rafter that reaches from the plate to the facia.

18. Exterior overhand of a roof. Usually consists of boards, panels and mouldings.

19. A pre-built structural unit used to form the roof and ceiling surfaces. They rest on the exterior walls and span the entire width of the structure.

20. The total distance that the rafters protrude above the plate line of a structure.

21. A roof that rises from all four sides of a building.

22. A structural member that rests on the plates and runs to the purlin. Used for additional roof support.

23. Structural member that are ties between rafters on opposite sides of the roof.

24. A rafter that extends diagonally from the plate to the ridge in the hollow formed by the intersection of two roof sections.

25. That cut on the part of the rafter that extends beyond the building line.

26. A rafter that intersects neither the plate or the ridge and is terminated at each end by hip or valley rafters.

27. The cut on a rafter which allows the rafter to rest firmly on the plates.

28. A rafter that runs from the plate to the ridge at a 45^{o} angle to the corner of the building.

29. Any rafter that does not extend from a plate to the ridge.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Unit Eleven: Math Review NAME: _____

1. Divide 65' by 24" _____

2. Multiply 16.45 x 3 _____

3. Multiply 13.69 x 12 _____

4. Change 12.65" to 12 $\frac{\quad}{8}$"

5. Change .42 to sixteenths _____

6. Change 17.15" to 17 $\frac{\quad}{8}$"

7. Multiply 12.65" by 14. Put answer in feet and inches correct to nearest eighth of an inch. _____

8. Divide 912" x 16" _____

9. Divide 57' by 4/3" _____

10. Multiply 17.44" by 13½. Put answer in feet and inches correct to nearest eighth of an inch. _____

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Rafter & Roof Framing: Formal Summary NAME: _____

Directions: Listed below are pertinent terms and phrases dealt with in this unit. Discuss how each is important in the correct installation of roof framing members.

1. F.H.A. and city/county codes:

2. Various roof types:

3. Rafter terminology:

4. Common rafter cuts:

5. Hip and valley layout:

6. Jack rafter layout:

7. Describe what the number 12.65 that is found on the framing square means.

8. Change the following measurements to fractions that can be read on a steel tape.

a) 13.42" = 13____"

b) 17.44" = 17____"

c) 12.65" = 12____"

d) 18.76" = 18____"

Formal Summary continued

9. Find the length of each common rafter on a house with 4 in 12 roof and a span of 24' if the roof has a 2' overhang.

10. Find the lengths of the common, hip and first two hip jacks on a house with a 5 in 12 roof and a span of 28' if the roof has a 2' overhang.

11. A 12^0 x 20^0 garage has a 4 in 12 hip roof with a 2^0 overhang. Make a scale drawing ($\frac{1}{2}$" = 1') of the rafter layout. Draw in each rafter in its correct position. Label the kinds of rafters. Tell how many of each kind and their lengths. How long a ridge board is needed? Make a detailed material list for ordering rafter stock.

SECOND YEAR

UNIT WORK

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

FIRST YEAR REVIEW FOR SECOND YEAR STUDENTS

RESOURCE MATERIALS:

1. Textbook (Units 3, 5, 6, 7, 8 and 9)
2. Classroom Resource Materials
3. Resource Center

STUDENT RESPONSIBILITY:

A. 1. Read the units in the textbook that pertain to the various listed discussion topics.

2. Utilize all resource materials including F.H.A. and city/county codes.

B. In a written report discuss the following:

1. Process of setting up, sighting and shooting grade with a leveling instrument.
2. Display to the instructor knowledge of the use of the leveling instrument.

3. Using your plans, discuss the following:

   a. Architectural symbols required on floor plan and foundation plan.

      1. Draw all symbols.

      2. Name of construction feature that symbol represents.

      3. Indicate sizes where necessary.

   b. From the elevations, discuss the following exterior finish features:

      1. Siding types

      2. Roof and roofing type

      3. Gutter types

4. There are several methods used in the construction of footing and foundation forms. Two of the most common methods used in this area are on display in the classroom. Select one of these form types and discuss construction methods used in setting up, squaring, leveling, and pouring concrete.

5. Various blockouts are required prior to concrete pouring. Discuss.

6. Explain the difference between concrete and cement.

7. From your plan, determine the number of cubic yards of concrete necessary to pour the following:

   a. Footings and foundations

   b. Pier blocks

   c. Fireplace footing

8. Determine from your plan the type of subfloor construction used. Discuss the following construction details:

   a. Mudsill type and how anchored

   b. Beam size and spacing

   c. Post size and spacing

   d. Subfloor material and method of application

9. Discuss method used when framing openings in subfloors.

10. Discuss F.H.A. regulations pertaining to the following wall framing details:

    a. Studs

    b. Corner construction

    c. Framing openings

    d. Nailing procedures

11. Define and indicate material size of the following wall framing members:

    a. Stud

    b. Header

    c. Top plate

    d. Cripple

    e. Trimmer

    f. Sole plate

    g. Rough sill

12. Determine header length for the following door and window openings:

    a. 2' 6" x 6' 8" door

    b. 10' 0" x 5' 0" window

    c. 2 2' 6" x 6'8" bi-fold doors

    d. 16' 0" x 7' 0" garage door

13. Discuss framing procedures used on one wall of your model. Begin with laying of plate to raising of wall.

14. Define the following:

    a. Balloon framing

    b. Platform framing

    c. Exterior wall

    d. Bearing wall

    e. Partition

    f. Double top plate

15. Discuss F.H.A. and city/county codes pertaining to exterior wall sheathing.

16. From your plan, determine the amount and cost of sheathing for the exterior of your model.

17. Discuss F.H.A. and city/county codes pertaining to ceiling joist framing.

18. Discuss the following:

    a. Ceiling joist spacing

    b. Joist size in relation to span

    c. Purpose and types of headers used in conjunction with ceiling joists

19. Discuss why backing is necessary.

20. Discuss material size and placement of backing.

21. Define the following roof types:

    a. gable

    b. shed

    c. hip

    d. flat

    e. mansard

    f. gambrel

22. Define the following roof framing members:

    a. common rafter

    b. hip rafter

    c. valley rafter

    d. hip jack rafter

    e. valley jack rafter

    f. cripple rafter

    g. ridge board

    h. purlin

    i. kicker

    j. collar tie

    k. pre-built truss

23. Thoroughly discuss the process used to lay out a common rafter using the framing square.

24. Determine the length of the first hip jack rafter for a building with a span of 24'-0". (Use mathematical method)

25. Upon completion, submit for grading.

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T. I. P.

UNIT TWELVE: Roof Sheathing, Cornice Construction, and Gutter Installation

OBJECTIVE: Upon completion of this unit each student will have knowledge of and experience in applying roof sheathing, gutters and various cornices.

RESOURCE MATERIALS:

1. Textbook (Units 9, 10 and 12)
2. Classroom resource materials
3. Resource Center
4. On-site construction through independent study

STUDENT RESPONSIBILITY:

A. 1. Study text and F.H.A. codes pertaining to roof sheathing and cornice construction.

2. Utilize all available resource materials.

B. 1. Complete Unit 12 Math Review. Submit for grading.

2. Complete Unit 12 Communications Terminology. Submit for grading; be prepared for testing before formal summary.

C. In a written report, discuss the following:

1. F.H.A. codes pertaining to roof sheathing.
2. Determine number of sheets and total cost of roof sheathing material needed for your model.
3. F.H.A. codes pertaining to soffit or cornice construction, and gutters and downspouts.
4. From your plan, determine soffit or cornice type. Discuss construction methods to be employed (Unit 12).
5. Define: soffit panel, cornice, lookout, fascia board, soffit vent, frieze, ledger, gutter, and downspout.
6. From your plan determine the type of gutters and downspouts used.

7. Discuss installation procedures for the following gutter types (Unit 10):

   a. Wood gutters

   b. Metal gutters

   c. Mopped-in gutters

8. Determine materials needed (and cost) to construct cornices on your model. Include downspouts and gutters where applicable.

9. Upon completion, submit for grading.

D. 1. Install roof sheathing and cornice construction on your model.

   2. Upon completion, request evaluation by teacher.

E. 1. Upon completion of above student responsibilities, request formal summary. Complete and submit for grading.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Unit Twelve: Communications Terminology NAME:_____

____ cove moulding

____ frieze board

____ built up

____ lookout

____ laminated

____ galvanized

____ eave

____ soffit panel

____ gutters

____ ventilating

____ fascia board

____ ledger

____ penny

____ rake

____ soffit vent

____ downspouts

____ aluminum

1. A panel nailed on the underside of roof joists to close off the spaces between the joints.

2. A wood strip running between the lower end of a rafter and the outside wall; the soffit panel is nailed to it.

3. A wood member used for the outer face of a box cornice where it is nailed to the ends of the rafters.

4. An opening in a soffit panel to allow for the passage of air.

5. A decorative finished member that nails to the intersection of the last course of siding and the soffit.

6. A strip of wood attached to framing members to support joists or other horizontal framing.

7. Wooden or aluminum troughs attached to the edge of a roof to collect and conduct water from the roof.

8. Metal tubes extending from the gutter to the ground to conduct water away from the house.

9. A non-rusting, non-corrosive metal.

10. The margin or lower part of a roof that projects over the exterior wall.

11. The trim member that runs parallel to the roof slope and forms the finish between the roof and wall at a gable end.

12. Layers of waterproof material applied to a roof over which hot tar is applied.

13. The process of allowing air to move through an opening.

14. Layered material.

15. A coating of non-rusting, non-corrosive metal over another metal.

16. Moulding with a concave profile and used where two structure members make a right angle.

17. Term used to indicate nail length.

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T. I. P.

Unit Twelve: Math Review NAME:_____

1. Find area in square feet of a rectangle with dimensions $48\frac{6}{}$ x $22\frac{0}{}$.

2. Find area in square feet of a triangle with a base of 24' and an altitude of 16' 4".

3. Find area in square feet of a trapezoid with bases 56' 6" and 35' 3" and an altitude of 14'.

4. Find the area in square feet of a rectangle with dimensions 24' 9" x 54".

5. Find the area in square feet of a parallelogram with base $48\frac{0}{}$ and altitude $12\frac{0}{}$.

6. Find the area in square feet of a triangle with a base 16' and altitude 12'.

7. Find the area in square feet of a trapezoid with bases 38' and 20' and an altitude of 16'.

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T. I. P.

Unit Twelve: Roof Sheathing and Cornice Construction - Formal Summary

DIRECTIONS: Listed below are pertinent terms and phrases dealt with in this unit. Discuss how each is important in the correct application of roof sheathing and cornice construction.

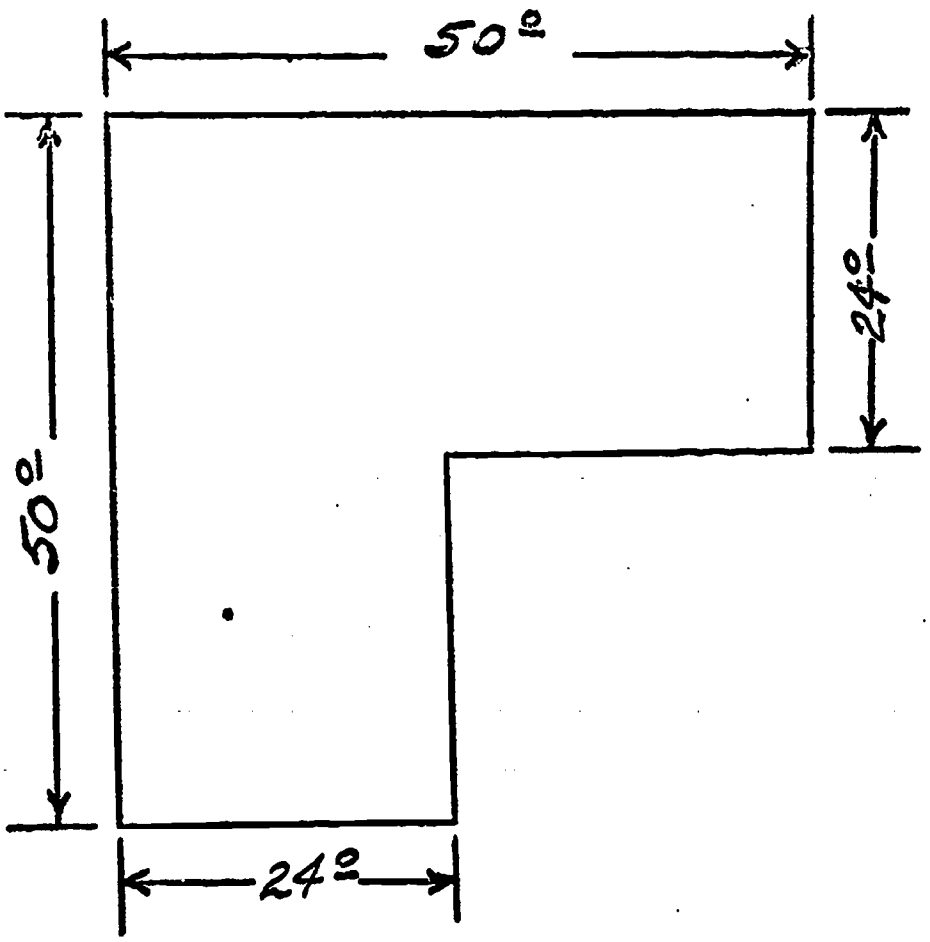
1. F.H.A. roof sheathing codes:

2. Discuss soffit or cornice construction of your model:

Formal Summary continued

3. If a rectangular building is 54^{0} x 26^{0} and has a 4 in 12 hip roof with a 2' overhang, determine the square feet of roof sheathing needed. How many sheets of plywood are needed?

4. For the L-shaped house shown, order the roof sheathing if the roof is a 4 in 12 gable roof with 2' overhang.



FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

UNIT THIRTEEN: Applying Roofing Materials

OBJECTIVE: Upon completion of this unit, each student will have knowledge of and experience in application of various roofing materials.

RESOURCE MATERIALS:

1. Textbook (Unit 10)
2. Classroom resource materials
3. Resource Center
4. On-site construction through independent study

STUDENT RESPONSIBILITY:

A. 1. Read unit in textbook.

2. Utilize all resource materials including F.H.A. and city/county codes.

B. 1. Complete Unit Thirteen Math Review. Submit for grading.

2. Complete Unit Thirteen Communication Terminology. Submit for grading. Be prepared for testing before formal summary.

C. In a written report, discuss the following:

1. F.H.A. and city/county codes pertaining to the application of the following roofing materials:

   a. Asphalt or composition shingles

   b. Built-up roofing (hot mop)

   c. Wood shingles

   d. Hand-split shakes

2. The following factors are required in the proper application of asphalt shingles. Discuss each.

   a. Asphalt roofing products are classified in three groups. Differentiate.

   b. Underlayment

   c. Valley flashing

d. Flashing at a wall

e. Nailing and fastening

f. Method of laying

g. Chimney flashing

h. Vent stack flashing

i. Hip and ridge finish

3. Built-up roofing

4. In order to properly apply wood shingles, the following factors must be kept in mind. Discuss each.

a. Type material and how made

b. Roof sheathing

c. Underlayment

d. Flashing

e. Nail types

f. Method of applying wood shingles

g. Hip and ridge finish

5. Hand-split shakes require the following laying procedures. Discuss each.

a. Shake types

b. Method of applying

c. Nailing procedures

d. Valley construction

e. Ridge and hip finish

6. From your plan, determine shingle type. Mathematically compute number of squares of shingles required to cover roof surface. Determine total cost of building paper, shingles and nails.

7. Upon completion, submit for grading.

D. 1. Apply roofing materials to your model. Care must be taken in order to maintain quality construction.

2. Upon completion, request evaluation by teacher.

E. Upon completion of above student responsibilities, request formal summary. Complete and submit for grading.

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T. I. P.

Unit Thirteen: Communications Terminology NAME:_____

_____ mineral fiber shingles

_____ square of shingles

_____ plain barbed nail

_____ pneumatic powered stapler

_____ 3 tab square butt strip shingle

_____ mineral surfaced roll

_____ wood shakes

_____ drip edge

_____ spiral thread nail

_____ coverage

_____ smooth roll

_____ exposure

_____ annular thread nail

_____ shingle butt

_____ valley flashing

_____ saturated felt

_____ underlayment

1. Amount of shingle material that will cover 100 sq. ft.

2. The amount of weather protection provided by the overlapping of shingles.

3. The shortest distance in inches between the edges of adjacent courses of shingles.

4. The lower exposed edge of a shingle.

5. Felt impregnated with asphalt or coal-tar; used for sheathing undershingles.

6. A roll of felt saturated with asphalt and has a smooth surface.

7. A roll of felt saturated with asphalt and surfaced with mineral granules.

8. A square shingle 12" x 36" with two slots that make three sections.

9. Asphalt-saturated felt that covers the roof under the shingles.

10. A metal strip bent at right angles that is installed on the edge of roofs under the shingles.

11. A metal strip that is installed in the valley intersection of two roofs.

12. A roofing nail with grooves on a part of its surface.

13. A roofing nail with grooves covering all of its surface.

14. A roofing nail with a large spiral grooves cut into its surface.

15. A power-driven stapling machine used for roofing.

16. Usually hand split cedar shakes with high durability.

17. Shingles manufactured from asbestos fiber and Portland cement.

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T. I. P.

Unit Thirteen: Math Review

NAME:_____

Show your work on this paper.

1. $44.69 + $12.58 + $7.49 + $83.01 = _____

2. 12.006 - 9.7542 = _____

3. 408 x 3.14 = _____

4. 2.8738 ÷ 2.7 = _____

5. 8 1/16 + 7 1/2 + 15 + 9 1/4 = _____

6. 49 1/16 - 25 1/2 = _____

7. 16 x 4 7/8" = _____

8. 4 1/5 ÷ 7/8 = _____

9. 30% of $545 = _____

10. 32 is what % of 128? _____

11. A man worked 47 3/4 hours during one week. If he earns $2.50 an hour for the first 40 hours and $3.75 an hour for overtime, how much did he earn that week?

12. The price of a new car is $3,450. If Mr. Green made a down payment of 15% of the price of the car, how much money did he pay down?

13. 5 2/3 yd. = _____ ft. = _____ in.

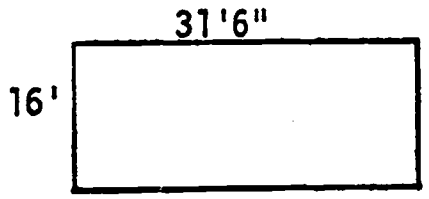
14. 88 5/8" = _____ ft. _____ in.

15. 7'3" ÷ 3 = _____

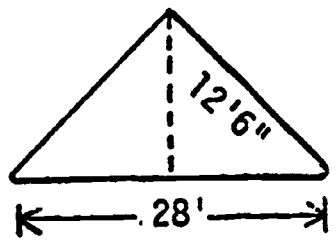
16. If a scale drawing has a scale of 1/8" = 1', what would be the lengths of the lines drawn to represent a rectangle 10' x 14'?

17. Find the areas of the following figures.

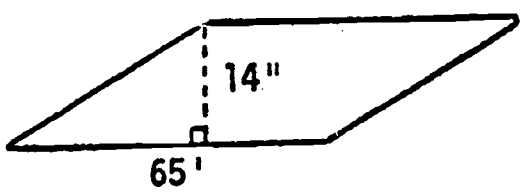
a)



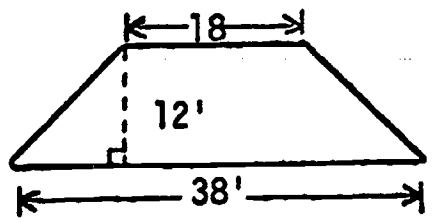
b)



c)



d)



FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Applying Roofing Materials: Formal Summary

DIRECTIONS: Listed below are pertinent terms and phrases dealt with in this unit. Discuss how each is important in the correct installation of roofing materials.

1. F.H.A. and city/county codes:

2. Roofing material types:

3. Your model requires a particular roofing material. Discuss the following factors pertaining to this roofing material:

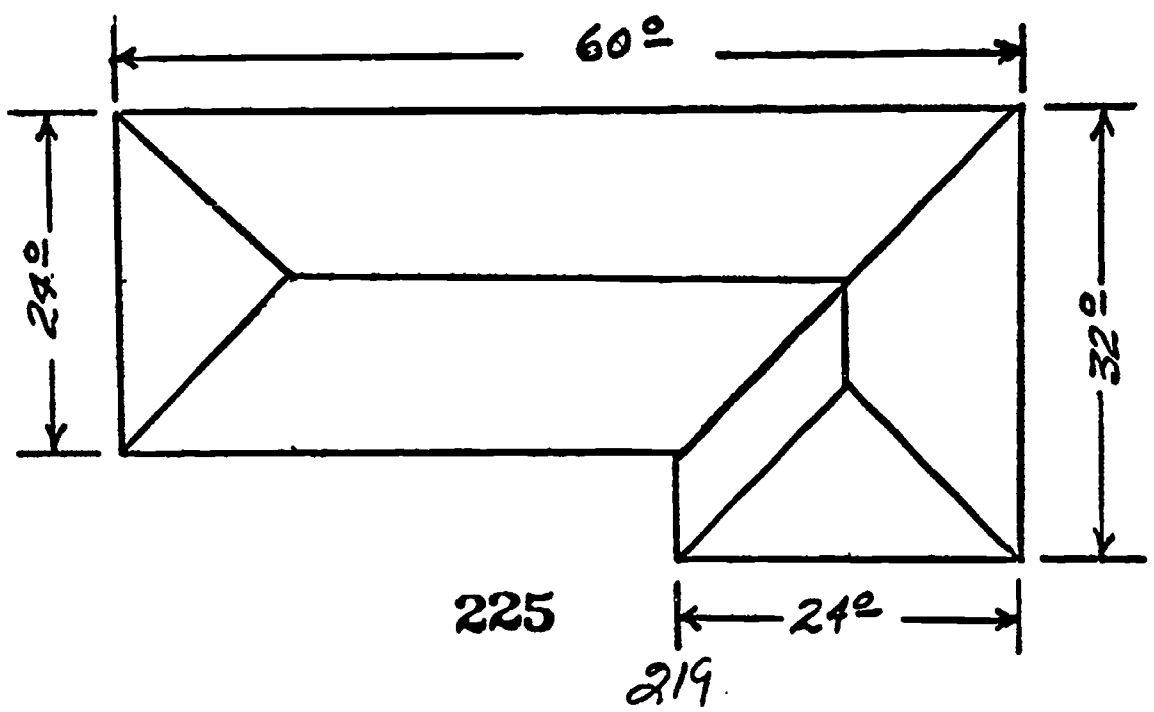
   a. Type:

Formal Summary continued

b. Nail types:

c. Process of application:

4. For the roof drawn below, determine the following:
(Figure length of common rafter as 13^{0})



Formal Summary continued

a. Square feet of building paper needed

b. Squares of 3 tab square butt strip shingles laid 5" to the weather needed

c. Pounds of nails needed

d. Feet of gutter needed

e. Feet of hip and ridge shingles needed

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

UNIT FOURTEEN: Exterior Carpentry Finish

OBJECTIVE: Upon completion of this unit, each student will have knowledge of and experience in the installation of exterior doors, windows, siding.

RESOURCE MATERIALS:

1. Textbook (Unit 11 & 12)
2. Classroom resource materials
3. Resource Center
4. On-site construction through independent study

STUDENT RESPONSIBILITY:

A. 1. Read units in textbook.

2. Utilize all resource materials including F.H.A. codes.

B. 1. Complete Unit Fourteen Math Review. Submit for grading.

2. Complete Unit Fourteen Communication Terminology. Submit for grading. Be prepared for testing before Formal Summary.

C. In a written report, discuss the following:

1. F.H.A. codes pertaining to exterior aluminum windows, sliding glass doors, exterior doors and garage doors.

2. Window types:

a. casement

b. multiple-use window

3. Briefly discuss process of installing windows.

4. Discuss installation of the following:

a. exterior door frames

b. sliding glass doors

c. garage doors

5. From your plan, indicate the number and sizes of all exterior windows and doors. Include garage door.

6. F.H.A. codes pertaining to the following types of exterior siding:

   a. horizontal siding (bevel)

   b. vertical siding

   c. wood shingles

   d. plywood siding

   e. hardboard siding

7. The following siding types are used in this area. Discuss each type and how it is installed.

   a. bevel siding

   b. vertical siding

   c. wood shingles

   d. plywood siding

   e. hardboard siding

   f. aluminum and vinyl siding

   g. brick or stone veneer

8. Determine from your plan the types of siding used, total board footage of each type, total cost of building paper, siding, and nails.

9. Upon completion, submit for grading.

D. 1. Install self-fabricated windows and siding on your model. Care must be taken to insure quality construction.

   2. Upon completion, request evaluation by teacher.

E. Upon completion of the above Student Responsibilities, request Formal Summary. Complete and submit for grading.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Unit Fourteen: Communications Terminology NAME:_____

_____ aluminum siding

_____ straightedge

_____ story poles

_____ double hung window

_____ priming coat

_____ textured reverse boards and batten

_____ hard board siding

_____ swing up garage door

_____ horizontal siding

_____ non-corrosive nails

_____ riser

_____ metal glazing clip

_____ casement

_____ brick veneer

_____ horizontal sliding window

_____ textured-one-eleven plywood siding

_____ bevel siding

_____ drip cap

_____ board and batten

_____ weather stripping

_____ threshold

_____ sidelight

1. A moulding which directs water away from a structure to prevent seepage under the exterior facing material.

2. A substance (usually liquid) that is coated on wood to prevent rot and harm by fungi and insects.

3. Nails that are coated with aluminum to retard corrosion due to exposure to weather.

4. Boards are first nailed vertically to the side of the house, and wooden strips are nailed over the joints between the boards.

5. The first coat of paint applied to the exterior siding.

6. Exterior plywood that has random width with closely spaced grooves cut into the surface.

7. Exterior plywood that has deep, wide grooves cut into brushed or rough textured cedar.

8. Exterior plywood that has rough sawn sections that create a lap effect with shadow lines ever 8".

9. Exterior plywood that has deep and wide grooves cut into the face for sharp shadow lines.

10. The vertical stair member between two consecutive stair treads.

11. A complete door unit including frame and door that are put together in a factory and is ready to install.

12. Narrow strips of metal, vinyl, plastic or other material that are installed around windows and doors to retard passage of air or moisture.

_____ plank-textured plywood siding

_____ shim

_____ prehung door

_____ hardware and counter-balances

_____ striated plywood siding

_____ vertical siding

_____ vinyl siding

_____ awning

_____ stone veneer

_____ roll up garage door

_____ door sill

_____ wedge blocks

_____ preservative

13. A garage door that is a rigid single door and swings upward and inward.

14. A garage door that has hinged sections that bend as the door swings upward.

15. Track, hinges, bolts, and springs used to install movable garage doors.

16. Exterior finished siding; boards of varying widths nailed horizontally on the extereior of the house.

17. Exterior finished siding; boards of varying widths nailed vertically on the exterior of the house.

18. A manufactured siding made of pressed wood fiber and formed into a panel.

19. Siding boards that are sawn on a bevel in a "wedge-shaped" manner.

20. Metal siding that is highly durable and is manufactured in a variety of panel styles.

21. A manufactured siding that is tough and durable and is made in a variety of colors and styles

22. Bricks that are mortared together to make exterior siding.

23. Stone that serves the same purpose as brick; it is an exterior siding material.

24. A window that consists of two sashes that slide up and down in the window frame.

25. A window that has two or more sashes, at least one of which moves horizontally within the window frame.

26. A window that has a sash that is hinged on the side and swings outward.

27. Windows that have one or more sash hinged at the top and swings out at the bottom.

28. A strip of wood upon which is laid out various vertical reference heighths; used to establish height and size of rough openings.

29. Tapered pieces of wood that are wedged between a window and rough sill to adjust window to proper height.

30. A metal clip inserted between the glass and frame to prohibit contact.

31. A piece of wood under the threshold of the door, resting on the foundation and supporting the uprights of the frame.

32. A beveled wood member used to close the space between the sill and the bottom of the door.

33. A straight strip of wood or metal used to lay out or check accuracy of work.

34. A window that runs vertically on the side of a door to provide effect and light.

35. A thin strip of wood usually wedge shaped, used for leveling doors and windows.

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Unit Fourteen: Math Review NAME:_____

Show your work on this paper.

1. .081 + .35 + 2.076 + 10.009 = _____

2. 5 5/8 + 3 3/4 + 26 1/8 + 17 1/2 = _____

3. 3615 - 2708 = _____

4. 83 1/8 - 65 3/4 = _____

5. 24 - 5 5/16 = _____

6. 39 x $5.09 = _____

7. 56 x $3.98 = _____

8. 6 x 4 3/4 = _____

9. 2 x 1 5/8 = _____

10. 6'0" + 1 5/8" + 1 5/8" + 1 1/2" = _____

11. 29% of 1040 = _____

12. 1200 + 23% of 1200 = _____

13. Find wall area of an 8' wall 65' long if there are two 6^{0}_{-} x 3^{0}_{-} windows, an 8^{0}_{-} x 5^{0} window, and a 3^{0} x 6^{8}_{-} door in this wall. Find answer correct to the nearest square foot.

14. How many feet of gutter are needed for a rectangular house 24^{0}_{-} x 55^{6}_{-} if it has a gable roof? A hip roof?

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T. I. P.

Exterior Carpentry Finish: Formal Summary

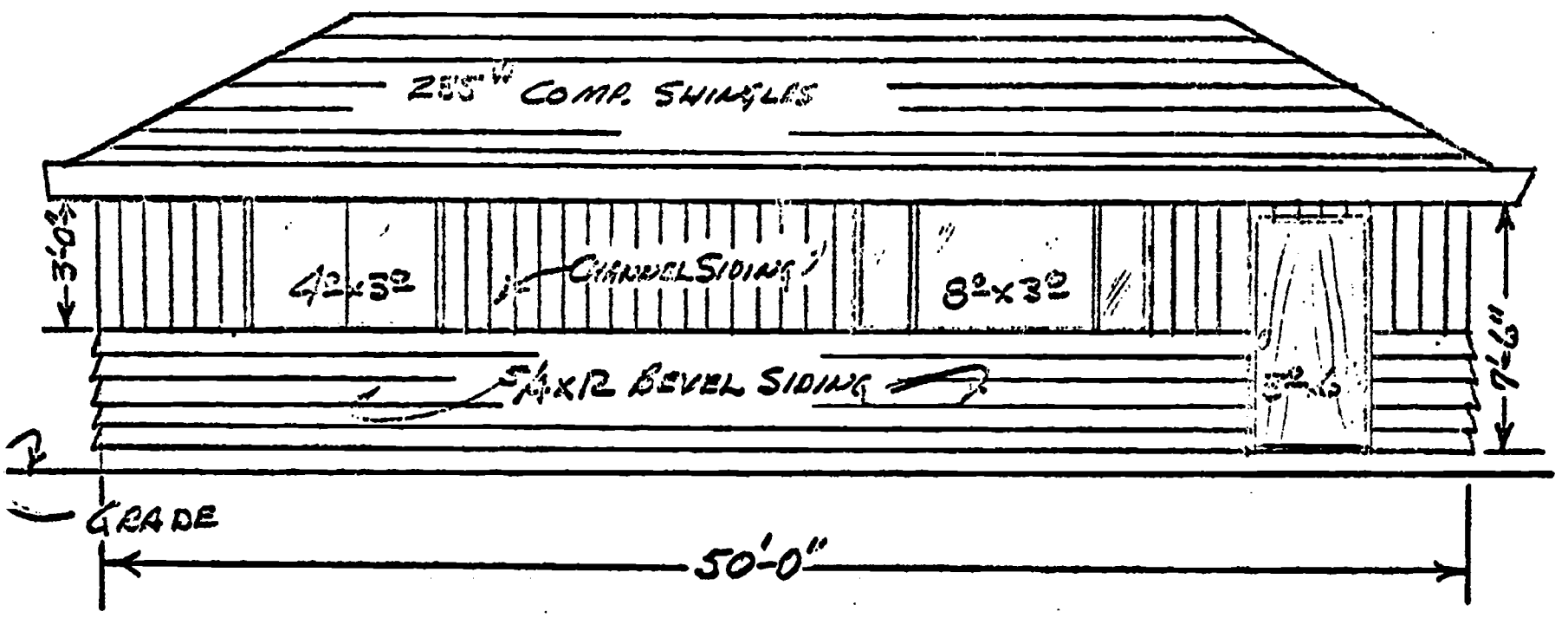
DIRECTIONS: Listed below are pertinent terms and phrases dealt with in this unit. Discuss how each is important in the correct installation of exterior doors, windows, and siding.

1. Window installation process:

2. Swinging door installation process:

3. Discuss process used to install exterior siding to your model:

4. For the exterior wall shown, determine how much of each kind of siding is needed.



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UNIT FIFTEEN: Interior Construction

This unit is separated into four major areas:

I. Thermal Insulation
II. Interior Wall and Ceiling Finish
III. Finish Flooring
IV. Doors and Interior Trim

OBJECTIVE: Upon completion of this unit, each student will have knowledge of all phases of interior construction finish.

I. THERMAL INSULATION

RESOURCE MATERIALS:

1. Textbook (Unit 13)
2. Classroom resource materials
3. Resource Center
4. On-site construction through independent study

STUDENT RESPONSIBILITY:

A. 1. Read unit in textbook.

2. Refer to all resource materials including F.H.A. and city/ county codes.

B. 1. Complete Unit Fifteen (I) Math Review. Submit for grading.

2. Complete Unit Fifteen (I) Communications Terminology. Submit for grading. Be prepared for testing before Formal Summary.

C. In a written report, discuss the following:

1. The building sequence at this point.
2. Heat transmission:
   a. conduction
   b. convection
   c. radiation
3. Thermal insulation

4. Types of insulation and where used:
   a. flexible
   b. loose fill
   c. rigid
   d. reflective
5. Crawl space insulation
6. Condensation and vapor barriers
7. Purpose for ventilation devices and types used on your model
8. Installation procedures for batts and blanket insulation
9. Installation of fill insulation
10. Amount and cost of batt or blanket insulation required for exterior walls of your model
11. Upon completion, submit for grading.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Unit Fifteen: Communications Terminology NAME:_____

I. Thermal Insulation

_____ crawl space insulation
_____ visqueen film
_____ heat transmission
_____ flanges
_____ thermal insulation
_____ wire cloth
_____ vapor barriers
_____ convection
_____ reflective insulation
_____ insulating boards
_____ conduction
_____ blown-in fill
_____ rigid insulation
_____ batts and blanket insulation
_____ airway
_____ radiation
_____ prefabricated ventilators
_____ flexible insulation
_____ condensation
_____ loose fill insulation
_____ louvers

1. The passage of heat from one place to another.

2. Transmission of heat from one material to another.

3. The transfer of heat by air.

4. The transmission of heat by waves.

5. Insulation that restricts the flow of heat.

6. Insulation that is flexible and manufactured in blankets or batts.

7. Insulation that is granular and is poured or blown where insulation is required.

8. Insulation that is manufactured into boards.

9. An insulation that has metal foil on one facing surface that will reflect heat.

10. Insulation installed above a crawl hole usually composed of vapor barriers and insulation.

11. When moisture in the form of water vapor condenses into droplets.

12. Plastic sheets that are used for ventilation and restricts the passage of moisture.

13. Sheets of insulation with a foil side and has fiberglass or some other heat resistive material attached to it.

14. Manufactured heat resitive boards that are primarily attached to exterior walls

15. Another term for vapor barriers.

16. Slatted air vents under the peaks of roofs to allow for ventilation.

17. Wire mesh that is fastened inside the louvers to prevent the passage of insects.

18. The space provided between louvers for the passage of air.

19. Ventilators that are manufactured and are ready for installation.

20. Foil edges of insulation that are stapled to a wall.

21. Insulation that is blown in by a blower machine.

UNIT FIFTEEN: Interior Construction

II. INTERIOR WALL AND CEILING FINISH

RESOURCE MATERIALS:

1. Textbook (Unit 14)
2. Classroom resource materials
3. Resource Center
4. On-site construction through independent study

STUDENT RESPONSIBILITY:

A. 1. Read unit in textbook.

2. Utilize all resource materials including F.H.A. regulations.

B. 1. Complete Unit Fifteen (II) Math Review. Submit for grading.

2. Complete Unit Fifteen (II) Communications Terminology. Submit for grading. Be prepared for testing before Formal Summary.

C. In a written report, discuss the following:

1. Prior to installation of interior wall covering, certain tradesmen must have their work completed. Discuss the degree to which each of the following tradesmen have completed their work.

   a. carpenter

   b. plumber

   c. electrician

   d. F.H.A. inspector

2. F.H.A. codes pertaining to the following:

   a. lath & plaster

   b. gypsum drywall

3. Briefly discuss the following:

   a. plaster

   b. plaster base

c. lath application

d. reinforcing

e. plastering materials and methods

4. Discuss the following:

a. gypsum wallboard

b. single layer construction

c. measuring and cutting

d. nail types

e. joint and fastener concealment

f. outside corners

5. There are several different materials used to cover walls and ceilings in special areas or rooms. Discuss the following materials and indicate where each could be used:

a. solid lumber paneling

b. plywood

c. hardboard

d. ceiling tile

e. suspended ceilings

6. Develop an estimate of total wall and ceiling area to determine amount of and cost of gypsum drywall needed for your model.

7. Upon completion, submit for grading.

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T. I. P.

Unit Fifteen: Communications Terminology NAME:_____

II. Interior wall and ceiling finish

_____ joint and fastener concealment	1. Lath are thin strips of wood that are nailed to the interior frame and serve as a plaster base.
_____ lath and plaster	2. A masonry surface upon which plaster is applied.
_____ furring	3. Manufactured wall board composed of gypsum encased in cardboard.
_____ drywall construction	4. A single layer of wall board.
_____ accoustical tile	5. The concealing of joints and nail heads with sealing compound and tape.
_____ plaster base	6. A ceiling that is suspended from the overhead rafters to conceal pipes.
_____ insulating fiberboard lath	7. Application of wall board without plastering.
_____ gypsum wall board	8. Fire-resitive lathing over which plaster is applied.
_____ plastic laminates	9. Also called "thin coat", high-strength plaster laid 1/8" thick.
_____ single layer construction	10. Sheets of synthetic material that are thin, hard, smooth, and highly resistent to scratching and wear.
_____ veneer plaster	11. 1" x 3" wood strips that are nailed to a ceiling and upon which tile is laid.
_____ suspended ceiling	12. Ceiling tile that is manufactured to a absorb sound waves.

UNIT FIFTEEN: Interior Construction

III. FINISH FLOORING

RESOURCE MATERIALS:

1. Textbook (Unit 15)
2. Classroom resource materials
3. Resource Center
4. On-site construction through independent study

STUDENT RESPONSIBILITY:

A. 1. Read unit in textbook

2. Utilize all resource materials, including F.H.A. codes.

B. 1. Complete Unit Fifteen (III) Math Review. Submit for grading.

2. Complete Unit Fifteen (III) Communications Terminology. Submit for grading. Be prepared for testing before Formal Summary.

C. In a written report, discuss the following:

1. F.H.A. codes pertaining to the following finish flooring types:

a. wood strip

b. wood block

c. carpeting

d. resilient flooring

2. Discuss finish flooring. Include types and where used.

3. There are two main types of wood flooring used in this area. Discuss these types including subfloor preparation, fasteners used, and laying procedures.

4. Installation of resilient flooring requires the following installation procedures. Discuss:

a. underlayment:

b. installing resilient floor tile:

c. spreading adhesive:

d. laying tile:

5. Discuss subfloor preparations prior to laying wall-to-wall carpeting.

6. From your plan, determine types of finish flooring, required amounts of each type, and cost of each type.

7. Upon completion, submit for grading.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Unit Fifteen: Communications Terminology NAME:_____

III. Flooring

_____ Block flooring	1. Material used as the final wearing surface of a floor construction.
_____ finish flooring	
_____ rubber tile	2. Composition flooring generally made of asphalt or vinyl; highly resistent to wear.
_____ divergent staple	3. Tile that is made of a petroleum residue.
_____ flagstone	4. A plastic fire-proof tile.
_____ ring-grooved nail	5. A plastic tile.
_____ strip flooring	6. Tile that is made of compressed durable rubber.
_____ linoleum tile	
_____ resilient tile	7. Tile that is made of a petroleum and has a plastic decorative covering.
_____ slate	8. Large pieces of stone that are used for flooring in special areas.
_____ vinyl-asbestos tile	
_____ telegraph	9. A flat rock-like substance used for flooring in special areas.
_____ blind nail	10. A tile with a highly-glazed surface on one side.
_____ ceramic tile	
_____ asphalt tile	11. Wood flooring that is made of hard wood such as oak.
_____ plank flooring	12. Flooring that is made of narrow strips of oak wood usually of varying lengths.
_____ cement coated sinker nail	
_____ vinyl tile	13. Planks of varying widths and lengths that are finished flooring when sanded and finished.
_____ sleepers	14. Wood blocks of a cosistent size that serve as finished flooring.
_____ hardwood flooring	
_____ spline	15. Nailing flooring pieces on the tongue of the wood strip.

16. A small strip of wood that fits between two flooring strips to secure them together.

17. Strips of wood attached to a concrete surface and serve as a base for wood flooring.

18. A nail with grooves that ring the nail and is used in underlayment.

19. A special type of nail used for nailing underlayment.

20. A two-pronged staple that is used to secure underlayment.

21. When, after a period of time, nail-heads protrude upward under the tile or flooring and cause noticeable bumps.

UNIT FIFTEEN: Interior Construction

IV. DOORS AND INTERIOR TRIM

RESOURCE MATERIALS:

1. Textbook (Unit 17)
2. Classroom resource materials
3. Resource Center
4. On-site construction through independent study

STUDENT RESPONSIBILITY:

A. 1. Read unit in textbook.

2. Familiarize yourself with all resource materials including F.H.A. codes

B. 1. Complete Unit Fifteen (IV) Math Review. Submit for grading.

2. Complete Unit Fifteen (IV) Communications Terminology. Submit for grading. Be prepared for testing before Formal Summary.

C. In a written report, discuss the following:

1. F.H.A. codes pertaining to the following:

a. interior doors

b. interior wood trim

c. other millwork

2. In modern construction all interior doors are purchased as pre-hung units. Understanding of the construction of pre-hung units is essential in the proper installation of these units. Discuss the following factors:

a. interior door frames

b. installing door frames

c. hanging door

d. installing casing

e. door locks and installation

3. Discuss the following door types:

   a. panel doors

   b. flush doors

4. Discuss procedure for installing split-jamb type door unit.

5. Discuss the following door types and installation procedures.

   a. sliding doors (pocket type):

   b. sliding doors (bypass type):

   c. folding doors (bi-fold type):

6. From your plan, determine number, sizes, and types of doors required. Also determine if the swinging doors are left or right hand doors.

7. On aluminum framed windows, the apron and stool are the only millwork required. Discuss installation procedures of these millwork finish pieces.

8. Describe procedures for installation of door casing and base shoe.

9. From your plan, determine required footage and cost of the following:

   a. aprons

   b. stools

   c. door casing

   d. base shoe

10. Upon completion, submit for grading.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Unit Fifteen: Communications Terminology NAME:_____

IV. Doors and Interior Trim

_____ side casing
_____ miter
_____ bypass door
_____ panel door
_____ stool
_____ hollow-core door
_____ split-jamb door
_____ flush door
_____ base shoe
_____ baseboard
_____ pocket doors
_____ door casing
_____ solid-core door
_____ mullion trim
_____ apron
_____ head casing
_____ folding doors

1. Also called stile and rail door. Panels are installed between stiles and rails.

2. A door that has an interior wood frame with thin sheets of material applied to both sides.

3. Inside and outside door jambs that are nailed together when installed.

4. Doors that slide into a pocket in the wall.

5. Doors that slide on an overhead track and can bypass each other when opened and closed.

6. Pairs of doors hinged together and are suspended from an overhead track.

7. A door with an interior frame that gives an edge to the door but is hollow inside the frame; a thin sheet of wood is applied to the two faces.

8. A door that has a solid wood interior and thin sheets of wood applied to the faces.

9. A strip of wood that is applied to each side of the door to cover the space between the jambs and wall surface.

10. A piece of beveled trim applied against the wall immediately below the stool.

11. A type of moulding that is applied to the rough sill to finish the window opening.

12. A type of moulding that is used as trim around the perimeter of a floor where it joins the wall.

13. Small narrow moulding used around the perimeter of a room where the base meets the finish floor.

14. A type of moulding that is used as casing on the side of windows.

15. A type of moulding that is applied between a head jamb and the wall surface.

16. A type of moulding that is applied in the joint between a door panel or window glass and the mullion of the door or window.

17. Cutting moulding at a 45 degree angle.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Unit Fifteen: Math Review

NAME:_____

Show your work on this paper.

1. 29,316 + 7,894 + 5,622 + 35,278 = _____

2. 8 13/16 + 2 3/8 + 1 3/4 + 6 1/2 = _____

3. Subtract fifty-eight thousandths from four hundred thirty-seven thousandths.

4. 12 7/16 - 8 3/4 = _____

5. 16 2/3 x 3/5 = _____

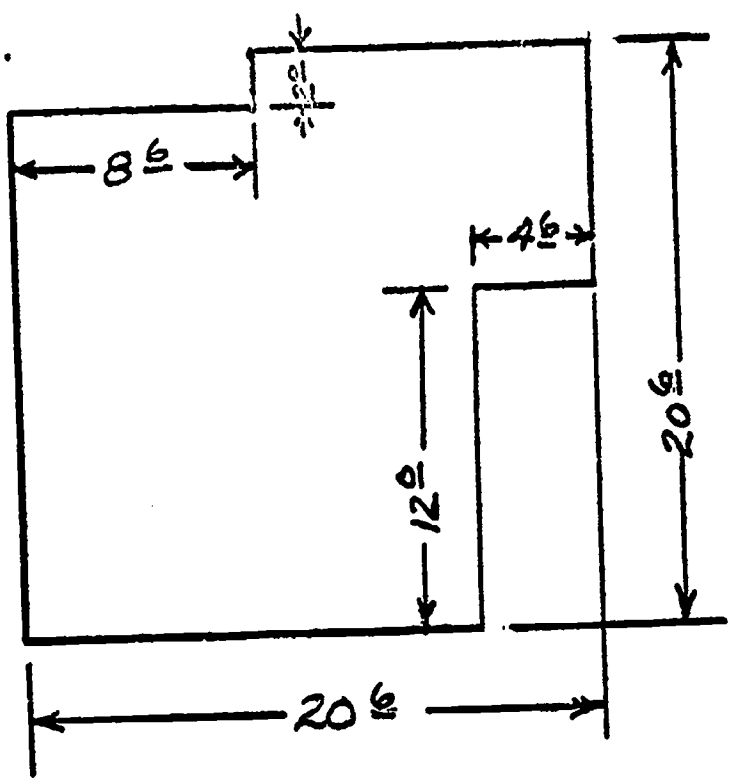
6. 35% of 60 = _____

7. 30% of _____ is 27.

8. If a storage bin is 18' long, 9' wide and 7' high, find the number of cubic yards of storage space in this bin.

9. How many board feet in 54 12 foot 2" x 6"?

10. Find the area and perimeter of the plan shown in this drawing.



FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Interior Construction: Formal Summary

DIRECTIONS: Listed below are pertinent terms and phrases dealt with in this unit. Discuss how each is important in the correct installation of interior finish features of a residential structure.

1. Discuss differences between:

   a. conduction
   b. convection
   c. radiation

2. Basically two types of insulation are used in this area. Discuss types and where used.

Formal Summary continued

3. Discuss purposes for vapor barriers.

4. Discuss hanging, nailing and joint concealment of gypsum wallboard.

Formal Summary continued

5. Discuss finish flooring types used on your plan.

6. Discuss subfloor preparation prior to installation of finish flooring.

7. List various interior door types used on your plan.

Formal Summary continued

8. Discuss various millwork pieces and where used to finish interior of your plan.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

UNIT SIXTEEN: Interior and Exterior Painting

OBJECTIVE: Upon completion, each student will have knowledge of the proper processes involved in providing a protective and decorative coat-int of paint to the interior and exterior of a structure.

RESOURCE MATERIALS:

1. Woodworking for Industry, by John L. Feirer, 1963. Unit 53: Paints and Painting.
2. Classroom resource materials
3. Resource Center

STUDENT RESPONSIBILITY:

A. 1. Read Unit 53 in Woodworking for Industry.
   2. Utilize all resource materials including F.H.A. codes.

B. 1. Complete Unit Sixteen, Math Review. Submit for grading.
   2. Complete Unit Sixteen, Communications Terminology. Submit for grading. Be prepared for testing before Formal Summary.

C. In a written report, discuss the following:
   1. F.H.A. codes pertaining to the following:
      a. paint materials
      b. paint application
      c. painting wood siding, millwork and trim
      d. painting exterior plywood.
   2. Changes in house paint and the paintability of wood.
   3. There are various types of exterior paints & finishes. Discuss the following:
      a. white lead paint
      b. titanium-lead zinc paint
      c. latex paint
      d. exterior natural finishes

4. Discuss common exterior painting problems.

5. Exterior painting of a building requires certain tasks be performed prior to paint application. Discuss painting outdoor surfaces.

6. Your plan does not indicate an exterior painting scheme. I want you to choose paint colors that will make your model the most attractive in the class. Work with your partners on this phase. Using the information in Unit 53, determine the amount of paint required to paint the exterior of a completed structure built from your plan.

7. Discuss F.H.A. codes pertaining to the interior painting and finishing of the following:

   a. gypsum wallboard surfaces

   b. millwork and trim

   c. plywood or hardboard

   d. wood floors

8. Interior painting requires that certain steps be followed to achieve a good paint job. Discuss interior paints and interior painting.

9. Choosing the interior paint colors is a tricky job. I want you to select interior paint colors for your plan and determine how much of each color would be required to paint a structure built from your plan.

10. In modern residential homes, all of the interior millwork is finished natural or very close to natural. Discuss the process by which you would finish the interior millwork of a new residential home.

11. The wood floor finish is the last operation performed in the construction of a residential home. Briefly discuss this operation.

12. Upon completion, submit for grading.

D. 1. Using the exterior paint colors that you have chosen, paint the exterior of your model. Care must be taken to insure a quality paint job.

   2. Upon completion, request final evaluation of your model. This will be done by all teachers of the T.I.P.

E. Upon completion of the above Student Responsibilities, request Formal Summary. Complete and submit for grading.

4. Discuss common exterior painting problems.

5. Exterior painting of a building requires certain tasks be performed prior to paint application. Discuss painting outdoor surfaces.

6. Your plan does not indicate an exterior painting scheme. I want you to choose paint colors that will make your model the most attractive in the class. Work with your partners on this phase. Using the information in Unit 53, determine the amount of paint required to paint the exterior of a completed structure built from your plan.

7. Discuss F.H.A. codes pertaining to the interior painting and finishing of the following:

   a. gypsum wallboard surfaces

   b. millwork and trim

   c. plywood or hardboard

   d. wood floors

8. Interior painting requires that certain steps be followed to achieve a good paint job. Discuss interior paints and interior painting.

9. Choosing the interior paint colors is a tricky job. I want you to select interior paint colors for your plan and determine how much of each color would be required to paint a structure built from your plan.

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11. The wood floor finish is the last operation performed in the construction of a residential home. Briefly discuss this operation.

12. Upon completion, submit for grading.

D. 1. Using the exterior paint colors that you have chosen, paint the exterior of your model. Care must be taken to insure a quality paint job.

   2. Upon completion, request final evaluation of your model. This will be done by all teachers of the T.I.P.

E. Upon completion of the above Student Responsibilities, request Formal Summary. Complete and submit for grading.

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Unit Sixteen: Communications Terminology NAME:_____

_____ caulking

_____ latex paint

_____ enamel

_____ blistering & peeling

_____ exterior natural finish

_____ lacquer

_____ white lead paint

_____ turpentine

_____ creosote

_____ primer

1. A paint that consists of carbonated white lead, linseed oil, drier and thinner.
2. A condition caused by excessive moisture in the walls, either from the interior or entering from the outside.
3. A paint type that is used on bare wood prior to applying the finish coats of paint.
4. A product that is used to protect against decay and attack from termites.
5. The process of sealing and closing all open cracks and joints.
6. A type of exterior finish that penetrates deep into the wood and allows the wood to retain its natural color.
7. An interior paint that gives a high gloss or semi-gloss finish. Comes in a wide variety of cclors.
8. A paint type that is made by emulsifying various chemicals in water.
9. An interior finish type that is used primarily on finish wood parts of a house. Generally applied with a spray gun.
10. A liquid made from resin dripping of pine trees. Used as a solvent and thinner for varnish paint and enamel.

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T. I. P.

Unit Sixteen: Math Review NAME:_____

1. Add: 5' 2 3/4", 7' 6 1/8", 3' 2", 4' 1½" _____

2. Subtract: 9' 6 7/8" from 15' 4¼" _____

3. Multiply: 9' 5" by 5 _____

4. Divide: 8' 6" by 6 _____

5. Change: 15' 3" to inches _____

6. Change: 67 3/4" to feet and inches _____

7. Find the cost of 3,450 bd. ft. at $135 per M. _____

8. 20¼ ÷ 4½ _____

9. Find the area of a floor 29½' x 19 3/4'. _____

10. Contractor's price is retail price less 15%. What is contractor's price on a power saw that retails for $69.95? _____

11. What is the wall area of a room 11' x 14' if it has 8' ceilings? (Disregard window and door openings) _____

12. Find the cost of 9 pcs. 2" x 4" x 14' at $98 per M. _____

FRANKLIN PIERCE HIGH SCHOOL
T. I. P.

Interior and Exterior Painting: Formal Summary NAME:_____

Directions: Listed below are pertinent terms and phrases dealt with in this unit. Discuss how each is important in the correct application of interior and exterior paints and finishes.

1. Discuss F.H.A. regulations pertaining to painting wood siding and exterior plywood:

2. Discuss process of painting walls, ceiling, and finishing interior millwork of a bedroom:

Formal Summary continued

3. Discuss wood floor finish:

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