    This programed mathematics textbook is for student use in vocational education
courses. It was developed as part of a programed series covering 21 mathematical
competencies which were identified by university researchers through task analysis of
several occupational clusters. The development of a sequential content structure was
also based on these mathematics competencies. After completion of this program the
student should be able to count decimal places, multiply any two decimal fractions, and
round off a product to a given number of decimal places. The material is to be used
by individual students under teacher supervision. Twenty-six other programed texts
and an introductory volume are available as VT 006 882-VT 006 909, and VT 006 975.
(EM)

FINAL REPORT
Project No. OE7-0031
Contract No. OEG-4-7-070031-1626
Report No. 16-K

Occupational Mathematics

MULTIPLICATION OF DECIMALS

June 1968

U.S. DEPARTMENT OF
HEALTH, EDUCATION AND WELFARE

Office of Education
Bureau of Research

Occupational Mathematics

MULTIPLICATION OF DECIMALS.

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Report No. 16-K

by

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OFFICE OF EDUCATION

OBJECTIVES

1. The student should know how to count decimal places.

2. The student should be able to multiply any two decimals.

3. The student should be able to round off a product to a given number of decimal places.

Greetings! You are about to begin improving your knowledge of basic mathematics. There are many important uses for the mathematics you are learning.

This booklet is not like your ordinary books. It is designed to help you learn as an individual. On the following pages you will find some information about mathematics. After the information is presented, you will be asked a question. Your answers to these questions will determine how you proceed through this booklet. When you have selected your answer to the question, turn to the page you are told to.

Do not write in this booklet. You may wish to have a pencil and some paper handy so you can write when you want to.

Remember this is not an ordinary book.

1. Study the material on the page.

2. Read the question on the page (you may want to restudy the material on the page).

3. Select the answer you believe is correct.

4. Turn to the page indicated by your answer.

Are you ready to begin?

Your answer was (b) No.

Well, this booklet is a little different.

Go back and read page B again. After you have read it,
you will probably be ready to begin.

In this Unit you will learn how to multiply numbers
containing decimals.

Let's get started.

How many decimal places are in the number .27 ?

The idea of a decimal place is one you must understand.

Go to Unit 8 (Concepts of Decimals and Fractions) and review the ideas presented there. Then, return to page 1 of this Unit.

No! You were wrong.

Notice that in .0095 each zero takes up one place just like each positive number. So, .0095 really has 4 decimal places. ZEROES ARE ALWAYS PLACE HOLDERS.

How many decimal places in .03009 ?

Wrong!

Finding the number of decimal places is really easy.
You simply find the decimal point and count the
number of digits to the RIGHT of the decimal point.
You should remember that digits are the counting
numbers 0 through 9.

Let's try again.

How many decimal places are there in .812 ?

Come on now! I know you can count.

Go back to page 4 and try again

No! That's not it.

Let's do one. For example, in the number .726
there are 3 decimal places because there are 3
digits to the right of the decimal point.

How many decimal places are there in .72658 ?

Sorry! I can't think of any other way to help
you.

Go to your teacher for an explanation.

Then go to page 1 of this Unit.

Sorry! I can't think of any other way to help you.

Go to your teacher for an explanation.

Then, go to page 1 of this Unit.

Correct!

Remember, simply count the digits to the <u>RIGHT OF</u>
<u>THE DECIMAL POINT</u> to find the number of decimal

places.

How many decimal places are in the number .1384 ?

Are you sure you counted correctly?

Better go back to page 9 and try again.

Incorrect!

You said one decimal place was in the number .1384.
Come on now. For each of the digits 1, 3, 8 and 4
you count one decimal place. Therefore, there are
4 decimal places in .1384.

I'll give you another chance.

How many decimal places in .201 ?

Don't be fooled by the zero. It takes up a place
too.

Go back to page 11 and try again.

Very good!

Here's a similar one.

How many decimal places in .0095 ?

Very good!

Here's a similar one.

How many decimal places in .0095 ?

2 ??   How did you get 2?

I think you'd better go back to page 3 and be a
little more careful when you work the problem this
time.

Sorry! That's not quite it.

It's really very easy. How many digits do you see
in the following number? (Remember, zero is a digit.)
The number is .00705. There are 5 digits. Right?
Then this number has 5 decimal places -- one for each
digit on the right of the decimal point. Come on
now. Concentrate!

How many decimal places are there in .006 ?

Very good! I think you have it.

Here's one more just to be sure.

How many decimal places are in .4005 ?

No! The correct answer was 4. Did you count
wrong? Don't be careless.

How many decimal places are in .706 ?

Sorry! That's not quite it.

It's really very easy. How many digits do you see in
the following number? (Remember, zero is a digit.)
The number is .00705. There are 5 digits. Right?
Then, this number has 5 decimal places -- one for
each digit on the right of the decimal point. Come
on now. Concentrate!

How many decimal places are there in .006 ?

Excellent!

Let's continue.

How many decimal places are there in 7.38 ?

Right! You weren't fooled by the number in front of the decimal point.

Here's another one.

How many decimal places are in 11.259 ?

How did you get 6? That is incorrect.

Simply count every digit (including zeroes) to the <u>RIGHT OF THE DECIMAL POINT</u>. Numbers to the left of the decimal point do not matter when counting decimal places.

How many decimal places are in 10.04 ?

No! Not quite. This one was a little tougher.

In counting decimal places, <u>DO NOT COUNT ANYTHING</u>
<u>TO THE LEFT OF THE DECIMAL POINT</u>!

Now let's try another one.

How many decimal places are in 738.6 ?

Incorrect!

Count only the digits to the right of the decimal point.

How many decimal places are there in 237.65 ?

Incorrect!

It doesn't matter what is on the left-hand side of
the decimal point when counting decimal places.
WE COUNT ONLY THE DIGITS TO THE RIGHT OF THE DECIMAL!

How many decimal places are in 3.724 ?

Very good! You were correct.

How many decimal places in 7003.20176 ?

(a) 9   Turn to page 28

(b) 6   Turn to page 22

(c) 5   Turn to page 40

Incorrect.

Count only the digits to the right of the decimal
point.

How many decimal places are there in 237.65?

No!

Granted, there were 9 digits. However, every digit does not add to the number of decimal places. Only digits to the right of the decimal point do.

How many decimal places are in 10.04 ?

No! Not quite. This one was a little tougher.

In counting decimal places, DO NOT COUNT ANYTHING TO THE LEFT OF THE DECIMAL POINT.

Now, let's try another one.

How many decimal places are in 738.6 ?

No! The number 237.65 has 2 decimal places.

Ask your teacher for additional help in this area.

Then return to page 20.

No! The number 237.65 has 2 decimal places.

Ask you teacher for additional help in this area.

Whoops! Careful now.

Remember, only places on the right of the decimal
count.

Go back to page 21 and try again.

Are you sure you counted correctly? A careless

mistake, maybe?

Quite correct! You are progressing well.

Here's another one.

How many decimal places are in 306.2 ?

Your answer is 3. You were a little careless in
your work.

Better go back to page 22 and try again.

Your answer was 3. You must have been a little careless.

Better go back to page 28 and try again.

Come on now! You're not trying hard enough.

In a number like 106.3049 there are 4 decimal
places. The 3, 0, 4, and 9 each take one place.

How many decimal places are in 170.03 ?

I know you can do better than that.

How can there be 4 decimal places in 306.2? Are there 4 digits to the right of the decimal point? No! There is only one. So, the number has <u>one</u> decimal place.

How many decimal places are in 10.706 ?

Come on now. You're not trying hard enough.

In a number like 106.3049 there are 4 decimal
places. The 3, 0, 4, and 9 each take one
decimal place.

How many places are in 170.03?

Very good!

So far we have been counting decimal places. The reason for this is that it is very important in multiplication. Let's do an example and see why.

Multiply: .3.2 x 1.6

$$
\begin{array}{r}
3.2 \\
\times 1.6 \\
\hline
192 \\
32 \\
\hline
5.12
\end{array}
$$

Notice that there are 2 decimal places in the result. How can you know? Simple.

The number of decimal places in the product is equal to the sum of the number of decimal places in the two numbers being multiplied.

Remember this rule.   Learn it well.

Let's see if you understand it.

How many decimal places would be in the product of

17.2 and 5.9 ?

A <u>Product</u> is the answer you get in a multiplication
problem.

For example, the product   5 and 4 is 20. Whenever
you are asked to find a product, it means you should
multiply.

No! Let's see how it should be done.

The numbers were 17.2 and 5.9. Each number has one decimal place. Right? O.K. Then the product would have 2 decimal places -- the sum of 1 and 1.

How many decimal places would be in the product of 3.19 and 5.8 ?

Come on now. Let's think a little.

The problem didn't ask you to count all the digits.

No! That's incorrect. I'll try to explain it one
more time.

To determine the number of decimal places in the
product of two numbers you should:

1. Count the number of decimal places in the
first number.

2. Count the number of decimal places in the
second number.

3. Add these results together.

4. The sum is the number of decimal places
that should appear in the product.

The product of 1.1 and 3.2 would have _____
decimal places.

Very good!

Here's another.

How many decimal places would be in the product of

14.786 and 2231.9 ?

I don't think you're trying very hard.

All you have to do is count decimal places like you did before. Only now you must add the number of places in two numbers. That isn't too tough, is it?

10 ?? You know better than that!

You counted all the digits. Now, try a little harder
on this one.

How many decimal places would be in the product of
4.71 and 9.622?

I don't think you're trying very hard.

All you have to do is count decimal places like you did before. Only now you must add the number of places in two numbers. That isn't too tough, is it?

You were careless! Did you count the digits on the
left side of the decimal? Which ones should you
have counted?

Correct!

How about trying another one?

How many decimal places would be in the product of
90.002 and 3.06 ?

No! That's incorrect. I'll try to explain it one more time.

To determine the number of decimal places in the product of two numbers you should:

1. Count the number of decimal places in the first number.
2. Count the number of decimal places in the second number.
3. Add these results together.
4. The sum is the number of decimal places that should appear in the product.

The product of 1.1 and 3.2 would have _____ decimal places.

Sorry, wrong answer. Did the zeroes confuse you?

Remember, in counting decimal places <u>TREAT A ZERO</u>
<u>THE SAME AS ANY OTHER DIGIT</u>.

Work this one.

There should be _____ decimal places in the product
of 1.07 and 90.32.

Sorry, wrong answer. Did the zeroes confuse you?

Remember, in counting decimal places <u>TREAT A ZERO</u>
<u>THE SAME AS ANY OTHER DIGIT</u>.

Work this one.

There should be _____ decimal places in the product
of 1.07 and 90.32.

Right! Keep up the good work.

How many decimal places in the product of 30.3 and
9.001 ?

No! That's incorrect. I'll try to explain it one
more time.

To determine the number of decimal places in the
product of two numbers you should:

1. Count the number of decimal places in the
   first number.
2. Count the number of decimal places in the
   second number.
3. Add these results together.
4. The sum is the number of decimal places that
   should appear in the product.

The product of 1.1 and 3.2 would have _____ decimal
places.

Correct! Now you should be ready to work some problems completely.

There are two things to remember:

1. Multiply the numbers as if no decimals are there.

2. Then, locate the decimal in the product.

What is the product of 3.2 and 4.1 ?

Oops! What did you do? You should have chosen
13.12, since it has two decimal places.

Here's another chance.

7.9 x 8.5 = ?

What ?? I think you slipped up on your multiplication.

.

Go back to page 57 and work it again.

Oops! What did you do? You should have chosen
13.12, since it has two decimal places.

Here's another chance.

7.9 x 8.5 = ?

You are having trouble, aren't you? Let's work an
example together.

What is 3.7 x 2.9 = ?
$$\begin{array}{r} 3.7 \text{ ---one decimal place} \\ \underline{\times 2.9} \text{ ---one decimal place} \\ 333 \\ \underline{74} \\ 10.73 \text{ --- two decimal places} \end{array}$$

Notice in the example that the answer has two decimal
places -- the sum of one decimal place from each of
the numbers: 3.7 and 2.9.

It is really very easy. Study this example until you
are sure you understand it.

O.K. Now try this one.

Multiply: 6.4 by 8.6.

You are having trouble, aren't you? Let's work an
example together.

What is 3.7 x 2.9 = ?

$$\begin{array}{r} 3.7 \\ \times 2.9 \\ \hline 333 \\ 74 \\ \hline 10.73 \end{array}$$

3.7 --- one decimal place
x2.9 --- one decimal place

10.73 --- two decimal places

Notice in the example that the answer has two decimal
places -- the sum of one decimal place from each of
the numbers: 3.7 and 2.9.

It is really very easy. Study this example until you
are sure you understand it.

O.K. Now try this one.

Multiply: 6.4 by 8.6.

No! You still are having trouble counting decimal

places. That's really all we are doing here.

.

Sorry, wrong again. You really missed that one.

You multiplied wrong, and your decimal was off too.

Better concentrate a little harder on this one.

What is 4.7 x 1.5 ?

No! You still are having trouble counting decimal

places. That's really all we are doing here.

Right! You're doing fine.

The product of 12.71 and 3.6 is _____.

Oops! You didn't multiply correctly.

Better go back to page 60 and try again.

You are having trouble, aren't you? Let's work an example together.

What is 3.7 x 2.9 = ?

```
        3.7 ---one decimal place
       x2.9 ---one decimal place
        333
        74
      10.73 --- two decimal places
```

Notice in the example that the answer has two decimal places -- the sum of one decimal place from each of the numbers: 3.7 and 2.9.

It is really very easy. Study this example until you are sure you understand it.

O.K. Now try this one.

Multiply: 6.4 by 8.6.

No! You didn't get it. Let's try to work it

together.

$$
\begin{array}{ll}
12.71 & \text{--- two decimal places} \\
\underline{3.6} & \text{--- one decimal place} \\
7626 & \\
\underline{3813} & \\
45.756 & \text{--- three decimal places}
\end{array}
$$

Notice that the total number of decimal places in the

problem add up to the number of decimal places that

appear in the product. THIS MUST ALWAYS BE TRUE.

Now you work this one.

32.46 x 19.7 = ____?____

No! You didn't get it. Let's try to work it
together.

$$
\begin{array}{r}
12.71 \quad \text{--- two decimal places}\\
3.6 \quad \text{--- one decimal place}\\
\hline
7626\\
3813\\
\hline
45.756 \quad \text{--- three decimal places}
\end{array}
$$

Notice that the <u>total number</u> of decimal places in the
problem add up to the number of decimal places that
appear in the product. <u>THIS MUST ALWAYS BE TRUE</u>.

Now you work this one.

32.46 x 19.7 = __?__

Correct!

See if you can do another.

Multiply: 12.19 and 2.8

Incorrect! Your problem si locating the correct
decimal position in the product.

The procedure is simple. First, multiply the numbers
as if no decimal were there. Then, count how many
total decimal places were in the numbers being multip'ied.
This total is the number of decimal places that
should be in your answer.

Let's try again.

4.17 x 2.3 = ?

Incorrect! Your problem is locating the correct
decimal position in the product.

The procedure is simple. First, multiply the numbers
as if no decimal were there. Then, count how many
<u>total decimal places</u> were in the numbers being multiplied.
This total is the number of decimal places that should
be in your answer.

Let's try again.

4.17 x 2.3 = ?

Come on now. Take a little more time.

You multiplied the numbers incorrectly.

Go back and try the problem on page 70 again.

Fine! Keep up the good work.

Try this problem.

The product of 22.70 and 10.10 is _____.

Yes! Your answer was correct.

But do you remember the rule about zeroes on the end
of a decimal? They really aren't needed, are they?
For example, you know that 15.78 = 15.7800 or that
125.362 = 125.362000. In the last problem you were
asked to multiply 22.70 and 10.10. Wouldn't it be
easier to simply make it 22.7 x 10.1? Sure it would.

Good! You correctly dropped the zeroes off the end
of the decimal.

Try this one.

Multiply: 14.2 by 7.5.

Incorrect!

How can you multiply a number larger than 22 by a
number larger than 10 and arrive at a number under
23? Before you choose an answer be sure it is
logical.

O.K. Let's try again.

What is 3.60 x 9.10 ?

Careful now! I think you get the idea, but don't

be careless when multiplying the numbers.

Go back to page 77 and rework the problem.

Wrong! The correct answer was given.

Remember what we have sai about zeroes on the end of a decimal? They can be left off.

Keep this in mind and go back to page 76 and try the problem again.

Yes! Your answer was correct. But do you remember
the rule about zeroes on the end of a decimal? They
really aren't needed, are they?

For example, you know that 23.71 = 23.7100 or that
956.398 = 956.3980000. In the last problem you were
asked to multiply 3.60 by 9.10. Wouldn't it be easier
to simply make it 3.6 x 9.1? Sure it would!

Keeping these things in mind, go back to page 77 and
work the problem again.

Page 81

No! You need to be more careful when you multiply.

You multiplied that one incorrectly.

Try this one.

12.36 x 7.5 = ?

What ?? How did you get that?

I think you were a little careless.

Very good!

Try this one.

81.7 x 4 = ?

Page 84

Watch it! Don't be careless when you multiply.

Go back to page 85 and be more careful this time.

Wrong answer: Let's take a look at one like it.

This type of problem is easier than most. When you
multiply a decimal by an integer, the number of
decimal places in the answer is always the same as
the number of decimal places in the number being
multiplied.

For example: 3.7 x 4 = 14.8

             14.96 x 8 = 119.68

             21.09 x 6 = 126.54

Just remember than an integer has no decimal places.
So, when you are counting decimal places in an answer,
an integer will not add any places. The rule you know
about counting decimal places still works.

Now you try another one.

Find the product of 21.6 and 4.

No! You are still having difficulty with locating
the decimal correctly.

You need to go over some of the ideas again.

Right!

Let's see if you can do another one.

Multiply: 3.1 by 17.0

Watch it! You should be able to work this problem
correctly.

3.1 x 17.0 really means 3.1 x 17. You should remember
that 17 = 17.0 = 17.0000----- and so on. Then,
3.1 x 17 = 52.7. There is one decimal place in the
product because the number 3.1 has one decimal place.

Now, what is 14.06 x 12.0 ?

      (a) 168.072   Turn to page 89

      (b) 168.72   Turn to page 92

      (c) 168.720   Turn to page 91

Incorrect! Somehow you put in a zero that didn't belong there. Let's work it together.

14.06 x 12.0 is really just 14.06 x 12.

```
   14.06
x     12
    2812
   1406
  168.72
```

Notice that the product has two decimal places -- the same as 14.06. This will always happen when you multiply by an integer.

Here's one more.

Find 17.00 x 3.9.

(a) 66.3   Turn to page 83

(b) 6.630   Turn to page 71

(c) 663.0   Turn to page 72

Watch it! You should be able to work this problem correctly.

3.1 x 17.0 really means 3.1 x 17. You should remember that 17 = 17.0 = 17.000--- and so on. Then, 3.1 x 17 = 52.7. There is one decimal place in the product because the number 3.1 has one decimal place.

Now, what is 14.06 x 12.0 ?

Do you remember that zeroes are not needed on the
end of a decimal?

Excellent!

Try this one.

$12.3 \times 21.114 = ?$

Oops! Better watch your multiplication.

No! You misplaced the decimal point. Also, do not round your answers in this unit unless instructed to do so.

Multiply: 321.1 x 28.6

Incorrect! Your problem is locating the correct decimal position in the product.

The procedure is simple. First, multiply the numbers as if no decimal were there. Then, count how many total decimal places were in the numbers being multiplied. This total is the number of decimal places that should be in your answer.

Let's try again.

4.17 x 2.3 = ?

Your answer was correct. You are progressing well.

Here's another one.

What is 2.32 x 10.3 = ?

No! You misplaced the decimal point. Also, do not round your answers in this Unit unless instructed to do so.

Multiply: 321.1 x 28.6.

No! Wrong answer.

Do you remember what we have been doing this entire Unit? We have been practicing the correct location of the decimal point. Let's review the rule once more. To find the number of decimal places in the product of two numbers, simply add up the number of decimal places in the two numbers being multiplied. This sum will be the number of decimal places that you should put in the product. Come on now. See if you can do better.

Try this one.

What is 32.2 x 8.71 ?

Incorrect! Your problem is locating the correct
decimal position in the product.

The procedure is simple. First, multiply the numbers
as if no decimal were there. Then, count how many
total decimal places were in the numbers being multiplied.
This total is the number of decimal places that should
be in your answer.

Let's try again.

4.17 x 2.3 = ?

Very gocd! You are doing well.

What is the product of 17.82 and 12.41 ?

No! Wrong answer. Do you remember what we have

been doing this entire Unit? We have been practicing

the correct location of the decimal point. Let's

review the rule once more. To find the number of

decimal places in the product of two numbers, simply

add up the number of decimal places in the two numbers

being multiplied. This sum will be the number of

decimal places that you should put in the product.

Come on now. See if you can do better.

Try this one.

What is 32.2 x 8.71 = ?

Oops! You mislocated your decimal in the answer.

See if you can do better on this one.

14.32 x 37.14 = ?

Oops! You mislocated your decimal in the answer.

See if you can do better on this one.

14.32 x 37.14 = ?

Excellent! You have demonstrated your ability to
multiply decimals. There is one other area we need
to discuss. That is the process of <u>rounding off.</u>

Sometimes you may have a number with four decimal
places, and perhaps you only want one decimal place.
In order to do this, you approximate by the process
known as <u>rounding off</u>.

For example, 8.32 rounded to the nearest integer
becomes 8.

12.489 rounded to one decimal place becomes 12.5.

732.675 rounded to two decimal places becomes 732.68.

Here is the general rule to follow:

To round off to a required number of decimal places,
look at the number one place to the right of the
required decimal place. If this number on the right
is 5 or more, raise the number on the left one higher.

If the number on the right is less than 5, make
no change. In either case, omit all numbers to
the right of the required number of decimal places.

Here's one for you to work.

Round 78.9135 to two decimal places.

No! You didn't quite catch it. Let's look at some more examples.

EXAMPLE 1

Rounding 3.638 to 2 decimal places gives us 3.64.

to 1 decimal place gives us 3.6.

to the nearest integer gives us 4.

EXAMPLE 2

Rounding 93.4812 to 2 decimal places gives us 93.48.

to 1 decimal place gives us 93.5

to the nearest integer gives us 93.

(On this last part, note that we do not round the 93.5, but the original number 93.4812.)

Study these examples. Make sure you understand how to do each one. If you need to review the rule, go back to page 104 and study it. Make certain you see how the rule applies to each example.

No! You didn't quite catch it. Let's look at some
more examples.

EXAMPLE 1

Rounding 3.638 to 2 decimal places gives us 3.64

to 1 decimal place gives us 3.6

to the nearest integer gives us 4

EXAMPLE 2

Rounding 93.4812 to 2 decimal places gives us 93.48

to 1 decimal place gives us 93.5

to the nearest integer gives us 93

(On this last part, note that we do not round the 93.5,
but the original number 93.4812.)

Study these examples. Make sure you understand how to
do each one. If you need to review the rule, go back
to page 104 and study it. Make certain you see how the
rule applies to each example.

Here is your problem.

What is 14.06 rounded to one decimal place?

Your answer is correct.

See if you can do another one.

Round of 128.7588 to three decimal places.

Incorrect.

You said 14.06 rounded decimal place is 14.
No! 14 would be correct ounded to the nearest
integer, but you were asked to leave one decimal
place.

Go back to page 107 and re-do the problem.

Excellent! You are doing very well.

What is .12345 rounded to four places?

No! Let's look at what you did.

You tried to round 14.06 into 14.07. But this isn't even rounding off, is it? When you round off, you always end up with fewer decimal places than you had to start with. What you did here was to add .01, which is incorrect.

Here's another one to work.

Round 5.788 to one decimal place.

What? Since when does 128.76 have three decimal places?

Better go back to page 108 and take another look at the problem.

No! You didn't get the point.

Go back to page 104 and start from there. Study
carefully before working the problems.

No! You didn't get the point.

Go back to page 104 and start from there. Study
carefully before working the problems.

No! You forgot the rule.

You must look at the decimal position to the right
of the number of places you want. If this number is
5 or more, you should raise the number on the left
by one. In our problem it was above 5, so you should
have increased it by one.

Do this problem.

Round 148.314 to two decimal places?

No! You forgot to drop the last digit after you
rounded.

Correct! Keep up the good work.

Round 59.3333 to two decimal places.

Watch it!

You rounded correctly to two decimal places. But
the problem asked for one place. Be sure to read
what the problem wants you to do.

Oops!

Notice that in the number .12345, the fifth decimal
position is a 5. Then, in rounding to four places,
we should increase by one the number to the left of
the 5. The correct answer to four places is .1235.

Round 10.639 to one decimal place.

No! Your answer was incorrect.

The number was 59.3333. To round this to <u>two</u> places, look at the third decimal place in 59.3333. This is less than 5. Right? So you simply write it as 59.33.

Now, round 93.28 to one decimal place.

No! Your answer was incorrect.

The number was 59.3333. To round this to <u>two</u> places,
look at the third decimal place in 59.333. This is
less than 5. Right? So you simply write it as
59.33.

Now, round 93.28 to one decimal place.

Very good!

In the last few problems you have been practicing
"rounding off." This process is often used after
performing multiplication, division, or possibly
some other operation. Let's see if you can combine
what you know about multiplication and rounding
off.

What is 10.3 x 17.4 rounded to one decimal place?

No! You should have gotten 180.2262 when you multiplied. Then, after rounding off to one decimal place you would get 180.2, the correct answer.

Try not to make any careless mistakes.

What is 38.4 x 17 rounded to the nearest integer?

What?? The question asked you to round to the nearest _integer_. Is 652.8 an integer? Of course not!

No! When you work a problem like this, you should

multiply the given numbers before you round off.

Never round off the numbers in the problem.

ROUND ONLY YOUR ANSWER!

See if you can do the problem on page 122 now.

Your answer was correct.   Very good!

What is .387 x 11 rounded to one decimal place?

Excellent! You multiplied correctly and rounded
off the product to obtain the right answer.

Multiply 25.5 by 1.23 and round off the product to
two decimal places.

No! You rounded off incorrectly.

Find the product of 9.2 and 8.3 correct to one

decimal place.

No! You forgot the rule.

You must look at the decimal position to the right of the number of places you want. If this number is 5 or more, you should raise the number on the left by one. In our problem it was above 5, so you should have increased it by one.

Do this problem.

Round 148.314 to two decimal places.

No! You're off the path.

All you need to do is multiply the numbers as they are. Then, when you get the product, round it off to the number of decimal places desired. O.K., see if you can do better now.

What is 12.1 x 3.2 rounded to one decimal place?

Try again! 4.26 does <u>not</u> have one decimal place.

You're just not concentrating!

Good job! You have made it through this Unit
successfully. Let's review what you have learned.

1. You should be able to count decimal places.

2. You should be able to multiply two decimals
   and correctly locate the decimal point in
   the product.

3. You should be able to round off a decimal
   to a given number of decimal places.

4. You should be able to multiply two decimals
   and round off your answer.

Now, go see your teacher for a test over this Unit.

31.4 would be correct to one decimal place. But
you weren't asked for one decimal place.

Oops! Did you forget the rule?

In this problem you multiplied 25.5 by 1.23 and
should have gotten 31.365. Now, to round to two
places, you look at the digit in the third place.
If it is five or over, you drop it and add one to
the digit on its left. So, to two decimal places
31.365 becomes 31.37.

Now, what is 1.7 x 3.4 to the nearest integer?

What? The problem asked for <u>one</u> decimal place.

Fine! Your answer was correct.

Now, what is the product of 25.5 and 13.21 to one

decimal place?

You still seem to be having difficulty with decimal places.

Remember, each digit to the right of the decimal point is one decimal place.

What is 3.6 x 2.1 to one decimal place?

No! You multiplied correctly, but you mislocated the decimal point.

You should have noticed the 25 x 13 even without any decimals would be larger than 33.69. Sometimes a little common sense can be very helpful.

What is 7.3 x 1.61 rounded to two decimal places?

Oops! You weren't very careful with your multiplica-
tion.

What is 17.4 x 1.2 correct to one decimal place?

No! You rounded off incorrectly.

Find the product of 9.2 and 8.3 correct to one

decimal place.

What? The problem asked you to round off your
answer to the nearest integer.

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CAI MATHEMATICS

TEST QUESTIONS

UNIT 10 - MULTIPLICATION OF DECIMALS

Directions: The correct answers will always be expressed in lowest terms.

1. How many decimal places are there in .203?

    a) 1

    b) 2

    c) 3

2. What is (2.3) (3.6)

    a) 8.28

    b) 828

    c) .828

3. Multiply 17.3 and 4.6 and round off to one decimal place.

    a) 79.58

    b) 79.6

    c) 79.5

4. There are _____ decimal places in 17.06

    a) 0

    b) 2

    c) 4

5. What is 3.7 x 9.31

    a) 34.447

    b) 35

    c) 3.45

Unit 10 (continued)

6. Multiply .312 by .24 and round off to three places.

   a) .0749

   b) .075

   c) .749

7. Write 12345 with three decimal places

   a) 12.345

   b) .12345

   c) 123.45

8. Multiply the numbers 17.42 and 3.9

   a) 679.4

   b) 67.838

   c) 67.938

9. How many decimal places should be in the product of 1.73 and 12.611?

   a) 4

   b) 5

   c) 6

10. How many decimal places are in .1256?

    a) 1

    b) 3

    c) 4

11. What is 14.06 x 12.0

    a) 168.72

    b) 168.072

    c) 168.1

12. Round off 23.14 x 7.93 to one decimal place

    a) 183.5002

    b) 161.2

    c) 183.5

13. How many decimal places in 10.07513

    a) 7

    b) 5

    c) 2

14. Multiply 50 by .003

    a) .15

    b) .015

    c) .0015

15. How many decimal places should be in the product of 23.96 and 15.3233?

    a) 4

    b) 5

    c) 6

16. In .3712, the second decimal place is the

    a) 3

    b) 7

    c) 1

17. Multiply .08 by .0071

    a) .000568

    b) .0568

    c) .568

18. Multiply 14.1 by 3.16 and round to one place

    a) 44.5

    b) 42.56

    c) 44.6

19. How many decimal places in 3758.5?

    a) 1

    b) 4

    c) 5

Unit 10 (continued)

20. What is .33 x .33?

    a) 1.089

    b) .1079

    c) .1089

21. Round off 132.315498 to three-decimal places

    a) 132.3

    b) 132.315

    c) 132.316

22. Count the decimal places in 3.1416

    a) 4

    b) 5

    c) 3

23. Multiply 129.3 and .004

    a) .5172

    b) 5.172

    c) 51.72

24. Round off .0003 to two decimal places

    a) .01

    b) 1.0

    c) .00

25. Which of the following has 2 decimal places?

    a) 2.025

    b) 20.25

    c) 202.5

ANSWER SHEET

UNIT 10 – MULTIPLICATION OF DECIMALS

1.	c	15.	c
2.	a	16.	b
3.	b	17.	a
4.	b	18.	c
5.	a	19.	a
6.	b	20.	c
7.	a	21.	b
8.	c	22.	a
9.	b	23.	a
10.	c	24.	c
11.	a	25.	b
12.	c		
13.	b		
14.	a		

To the instructor: The above problems are related to the objectives as follows:

OBJECTIVE 1 : Questions 1,4,7,10,13,16,19,22,25

OBJECTIVE 2 : Questions 2,5,8,11,14,17,20,23

OBJECTIVE 3 : Questions 3,6,9,12,15,18,21,24