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ABSTRACT

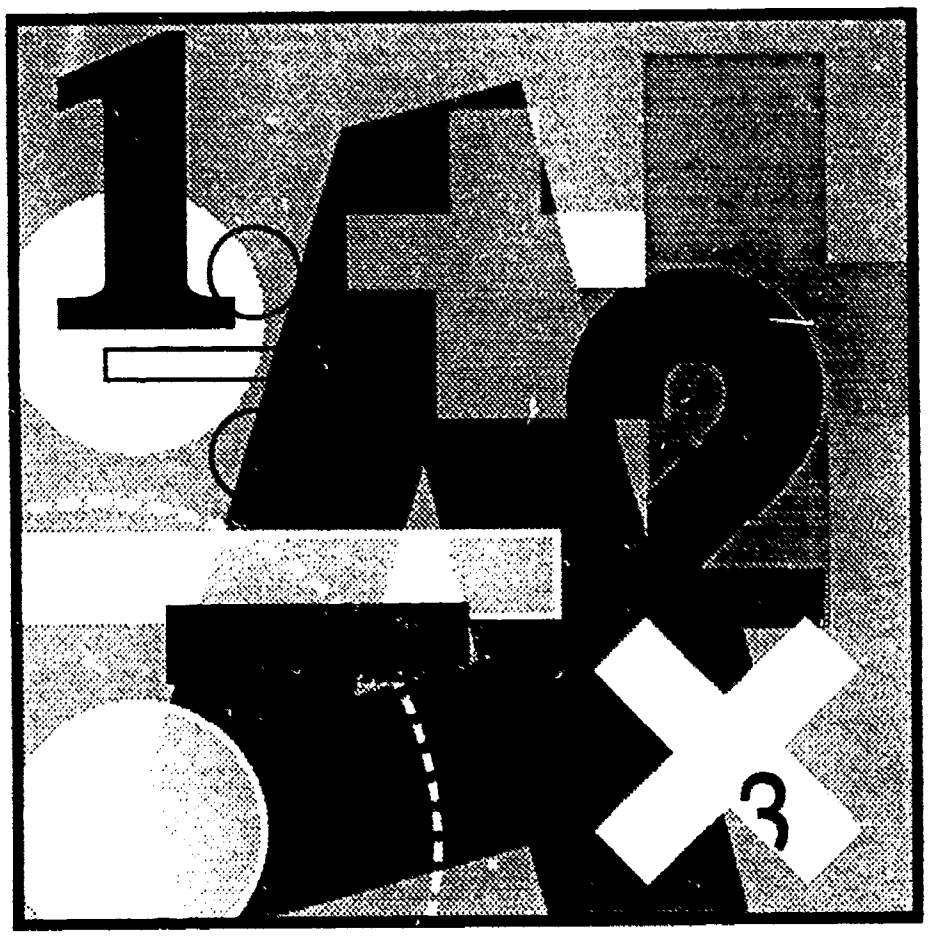
The National Assessment of Educational Progress (NAEP) is a congressionally mandated statistical survey of educational achievement of U.S. students in a variety of curriculum areas and of changes in that achievement over time. The National Assessment Governing Board (NAGB) established new standards for reporting the results that resulted in three achievement levels: basic, proficient, and advanced. This book of the Initial Performance Standards for the 1990 NAEP Mathematics Assessment, reports the results on 61 Grade 8 items released to the public for the state of Iowa. The book is organized in four sections. Section 1 reports the percentages of students in Iowa at or above each achievement level, and compares these results to the regional and national percentages. The Iowa results are also tabulated by gender, race/ethnicity, type of community, and parents' education. Section 2 gives information on how to read the tables in the subsequent sections and definitions are provided to assist readers in the interpretation of these data. Sections 3 and 4 provide the Iowa, Regional, and National results for Grade 8 released items. (MDH)

National Assessment Governing Board

The LEVELS of Mathematics Achievement

Initial Performance Standards for the
1990 NAEP Mathematics Assessment

Iowa



Prepared by Aspen Systems under contract with the National Assessment Governing Board

What is The Nation's Report Card?

THE NATION'S REPORT CARD, the National Assessment of Educational Progress (NAEP), is the only nationally representative and continuing assessment of what America's students know and can do in various subject areas. Since 1969, assessments have been conducted periodically in reading, mathematics, science, writing, history/geography, and other fields. By making objective information on student performance available to policymakers at the national, state, and local levels, NAEP is an integral part of our nation's evaluation of the condition and progress of education. Only information related to academic achievement is collected under this program. NAEP guarantees the privacy of individual students and their families.

NAEP is a congressionally mandated project of the National Center for Education Statistics, the U.S. Department of Education. The Commissioner of Education Statistics is responsible, by law, for carrying out the NAEP project through competitive awards to qualified organizations. NAEP reports directly to the Commissioner, who is also responsible for providing continuing reviews, including validation studies and solicitation of public comment, on NAEP's conduct and usefulness.

In 1988, Congress created the National Assessment Governing Board (NAGB) to formulate policy guidelines for NAEP. The board is responsible for selecting the subject areas to be assessed which may include adding to those specified by Congress; identifying appropriate achievement goals for each age and grade; developing assessment objectives; developing test specifications; designing the assessment methodology; developing guidelines and standards for data analysis and for reporting and disseminating results; developing standards and procedures for interstate, regional, and national comparisons; improving the form and use of the National Assessment; and ensuring that all items selected for use in the National Assessment are free from racial, cultural, gender, or regional bias.

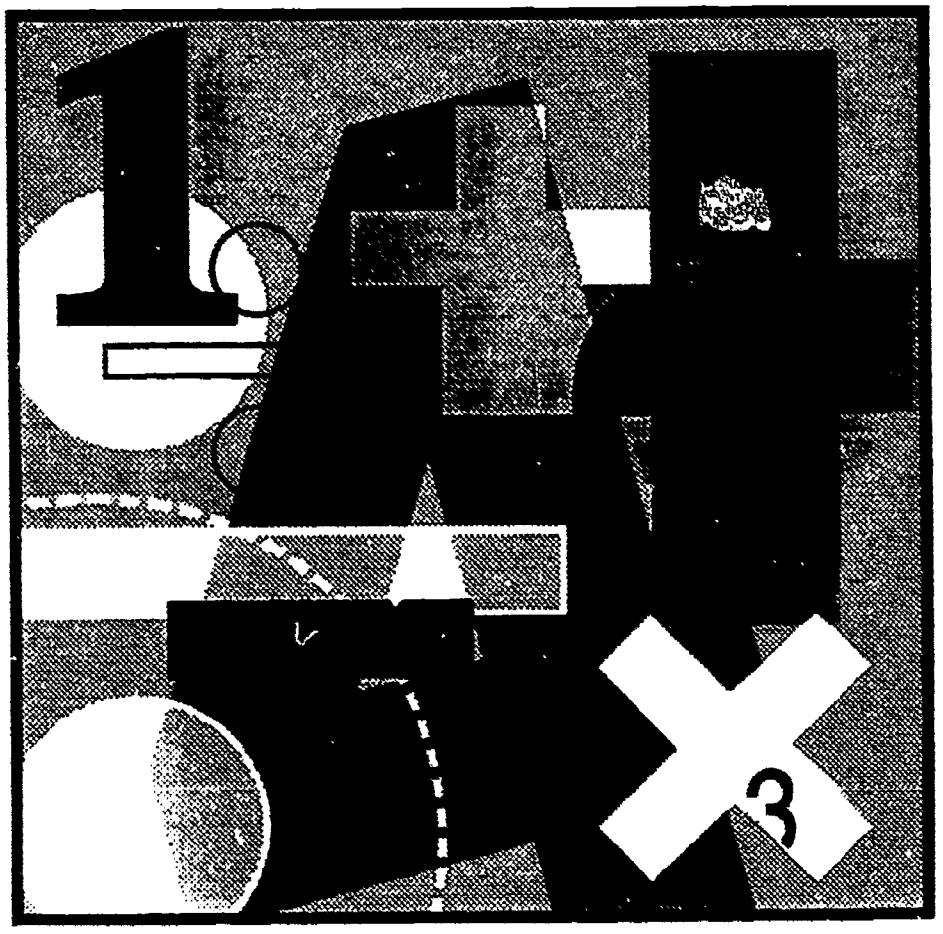
The National Assessment Governing Board

National Assessment Governing Board

The LEVELS of Mathematics Achievement

Initial Perfcrmance Standards for the
1990 NAEP Mathematics Assessment

Iowa



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FOR MORE INFORMATION:

The States participating in the initial NAGB performance standards project are listed alphabetically in both volumes of this Report. Copies are available from the individual participating States, as well as from the National Assessment Governing Board, while supplies last. Write:

NAGB Report
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Foreword

This report marks a major milestone in the evolution of the National Assessment of Educational Progress (NAEP). For the first time, with the mathematics achievement levels it presents, the Assessment not only describes what American students know and can do; it also includes a common yardstick--readily-understood--that can be used to evaluate whether that performance is good enough for our students and our nation to flourish.

In 1988, when Congress created the National Assessment Governing Board (NAGB) to set policy for NAEP, it made the Board responsible for identifying "appropriate achievement goals" for each grade and subject that NAEP tests. This was intended to be a break from past practice shared by NAEP with virtually all other achievement tests. In the past, the Assessment reported averages; it showed distributions; it charted trends; but it conveyed no standards or goals. As a matter of policy, it offered no clear definitions of what achievement *ought to be*. It contained no standard of good performance. Now it does.

The levels were adopted by the Board NAGB--after careful deliberation and listening to a great deal of advice--for use in interpreting results of the 1990 National Assessment of mathematics. Briefly, the achievement levels are standards, describing what students should know and be able to do on NAEP at grades 4, 8, and 12, the three grades surveyed by NAEP's representative-sample tests.

For each of these grades, the Board has adopted three achievement levels. The *proficient level* is central, defining solid grade-level performance that demonstrates competency in challenging subject matter--a formulation deliberately incorporated from the National Education Goals. The *basic level* for each grade denotes partial mastery of fundamental knowledge and skills. The *advanced level* signifies superior performance.

The detailed definitions of these mathematics achievement levels are presented in this report. They are illustrated by sample problems and expressed as proficiencies on the NAEP scale. For each level we also report the proportion of students in NAEP's 1990 sample survey that have met or exceeded the standard.

The Board is a suitable vehicle for setting achievement standards on NAEP. Its 24 members include local, state, and federal officials, educators from all parts of the country, and members of the general public. It is an independent Board by statute and disposition.

By adopting achievement levels for the 1990 assessment of mathematics, the Board has made it possible for the first time for educators, policy-makers, parents, and other interested citizens to interpret NAEP results according to common standards. Of course, these standards are judgments, as all standards must be. They represent the Board's best judgment, informed by the advice of many others. They do not necessarily represent a national consensus. However, the mathematics assessment to which they apply derives from a broad participatory process. The levels were adopted after careful deliberation, lively debate, and considerable advice from teachers, test experts, and the public. The Board members themselves have a broad range of experience, interest, and expertise.

For several reasons these achievement levels will make NAEP results more informative than they have been in the past:

- The defining language of the proficient level for each grade intentionally corresponds with the National Education Goal for student achievement, set by the President and the nation's Governors. Thus, NAEP's usefulness for tracking progress toward that goal is enhanced greatly.

- Having three levels for each grade permits far closer monitoring of student performance. This will direct attention and effort not just toward proficient achievement, but also toward students with the greatest need for improvement and also toward those who are near "world class" performance.

- The achievement levels will assist states to set their own targets for academic improvement. As NAEP is repeated in future years, states will be able to monitor their own progress in relation to these levels and targets.

Thus, as the policymaking board for the nation's only regular, representative report on student achievement, NAGB has set out to help track progress toward Goal 3 of the National Education Goals. It has sought to give meaning to the phrase "competency in challenging

subject matter" by developing clear, specific definitions for proficient achievement that firmly reflect this standard. As we completed our work on these mathematics achievement levels, we received encouragement from the National Education Goals Panel. At their request, we are releasing this report on the same day as their own.

This effort is a trial. It will be reviewed carefully before NAEP mathematics results are reported for 1992. Utilizing the same general definitions of basic, proficient, and advanced, the Board also plans to set achievement levels for the 1992 assessments in reading, writing, and again in mathematics. By 1994, the Board will also set standards for the new NAEP assessments in science, U.S. history, and geography, thus attending to all of the subjects named in Goal 3 of the National Education Goals.

These achievement levels describe a common core of mathematics learning that is important for all American children to acquire. They certainly do not prescribe how major topics should be taught. Indeed, by setting performance standards rather than presenting a curriculum guide or detailed procedures for teaching, we wish to encourage the initiative of teachers and schools, of local school boards, and states in devising different means to reach common ends. This is, in fact, quite the opposite of the pattern in many places where class time and lessons are prescribed but how much should be learned is left unstated.

Over the past century, American education has evolved into a vast and complex system. Unfortunately, in too many respects it has become a structure without a framework and the academic results as documented by NAEP have been disappointing. This year, NAEP has provided the first comparable, representative data on achievement in the different states, a program that must surely expand to fulfill the need for fair and accurate information on the outcomes of American education.

The achievement levels on NAEP are standards for judgment and encouragement, not edicts or commands. We believe they will make National Assessment results far more understandable to educators and the public. Hopefully, these standards will also function as a focus of effort and as a spur to reform. We believe the use of achievement levels for reporting NAEP results will help move this nation to examine seriously the state of our schools and to take decisive action toward improvement.

Richard A. Boyd
NAGB Chairman

Executive Summary

The National Assessment Governing Board (NAGB) has established new standards for reporting the results of the National Assessment of Educational Progress (NAEP). This effort, part of the Board's congressionally-mandated responsibilities, resulted in three achievement levels: basic, proficient, and advanced. The basic level denotes partial mastery of the knowledge and skills fundamental for proficient work at each grade. Proficient, the central level, represents solid academic performance and demonstrated competence over challenging subject matter. The advanced level signifies superior performance beyond proficient.

Under the Board's direction, an elaborate standard-setting process was employed to adapt these definitions of achievement to the subject matter and content of the 1990 Mathematics Assessment. This process incorporated the views of a broadly representative body of teachers, test experts, administrators, and interested members of the public. The initial application of these standards to the 1990 Mathematics Assessment and the Trial State Assessment marks a significant departure from prior practice. Previously, NAEP results have only been reported in terms of statistical profiles. Now, for the first time on the national level, the Board's new standards allow NAEP data to be reported in terms of what students *should* be able to do.

Results, presented for the first time in this report, indicate that just over 60 percent of the students in Grades 4, 8, and 12 are performing at or above the basic level on the 1990 NAEP Mathematics Assessment. Less than 20 percent of the students in these three grades reach the proficient level or beyond. The percentage of students at or above the advanced level ranges from 0.6 percent in Grade 4 to 2.6 percent in Grade 12. Over one-third of the students assessed did not reach the lowest level adopted by the Board.

There are variations in NAEP mathematics performance by gender, race/ethnicity, type of community, parental education, and (for Grade 12 students) number of mathematics courses taken. Generally, similar patterns are found for the nation as a whole and for participating states from the Trial State Assessment.

The percentage of males reaching the proficient and advanced levels in Grade 12 is greater than the percentage of females. Similar percentages of males and females, however, reach each achievement level in Grades 4 and 8.

Asian/Pacific Island students are more likely to reach the basic and proficient levels than are students from other race/ethnic groups. Whites have the second highest percentages at or above these same two achievement levels, significantly behind the Asian/Pacific Islanders, but above the other minority groups.

Students from disadvantaged urban communities are less likely to reach the basic level in Grades 4 and 8 than students from other types of communities. The percentage of students from extreme rural communities reaching the basic and proficient levels is above that for students from disadvantaged urban communities, but below that of students from advantaged urban communities.

The percentage of students at or above the basic and proficient achievement levels is also related to parental education. Students with the most educated parents are more likely to reach the basic and proficient levels in Grades 4, 8, and 12.

For Grade 12 students, there is a strong relationship between the number of high school mathematics courses taken and performance on NAEP. The percentage of students at or above the basic and proficient levels increases directly with the number of semesters of high school mathematics.

The significant (and sometimes substantial) diffferences across groups, however, are largely variations on a theme. Even in the most successful demographic groups, the majority of the students do not meet the performance standards set for the proficient level and only a small fraction of the students reach the advanced level. The failure of the students to reach the performance standards set by a broad-based group of citizens is not a phenomenon limited to isolated groups of students but, rather, a reflection of the performance of all segments of the population.

These findings, indicating that many students are not performing as well as they should be, are both revealing and diagnostic. As a result of the Board's actions, data and standards are now available for those seeking to make change. In addition to the information on the nation and participating states presented in this volume, state-level performance data for individual assessment items are presented in an accompanying volume.

The development and application of performance level standards represents an initial effort. These processes have been, and will continue to be, carefully evaluated by the Board and others. The Board remains committed to the use of performance level standards and will be continuing these activities in connection with future administrations of NAEP, including the assessments of mathematics, writing, and reading scheduled for 1992.

Section 1

Iowa

In Iowa, 20.2 percent of the students in Grade 8 do not reach the basic level (see Figure 3.1-IA). This is substantially better than the percentage for the Central region (35.9 percent) and for the nation as a whole (41.8 percent). Over one-half (53.1 percent) of the students are performing at the basic level. Another 25.0 percent of the students in this state are able to satisfy the requirements set for the proficient level, while 1.7 percent meet the standards for the advanced level.

Figure 3.2-IA and the tables for Iowa present the information in terms of the percentages of students "at or above" each achievement level. Almost four-fifths (79.8 percent) of Iowa's students are at or above the basic level. This is well above the comparable figures for the Central region (64.1 percent) and the nation as a whole (58.2 percent). Over one-fourth (26.7 percent) of Iowa's Grade 8 students are at or above the proficient level. Again, this is higher than the regional and national percentages (15.9 and 15.5 percent, respectively). In Grade 8, 1.7 percent of the students in Iowa reach the advanced level. This percentage is significantly higher than the percentage for the nation as a whole (0.8 percent).

These percentages at or above the basic, proficient, and advanced levels mean that 80 out of every 100 Grade 8 public school students in Iowa can perform the four basic arithmetic operations in solving one- and two-step problems. Over one-fourth of the students (those at or above the proficient level) can be expected to correctly answer more complex problems involving decimals, fractions, and percents. Approximately 2 percent of the students have a solid conceptual understanding of the interrelationships among fractions, decimals, and percents.

Figure 3.1-IA

Percentage of Students Below Basic and Within Each Achievement Level for Iowa

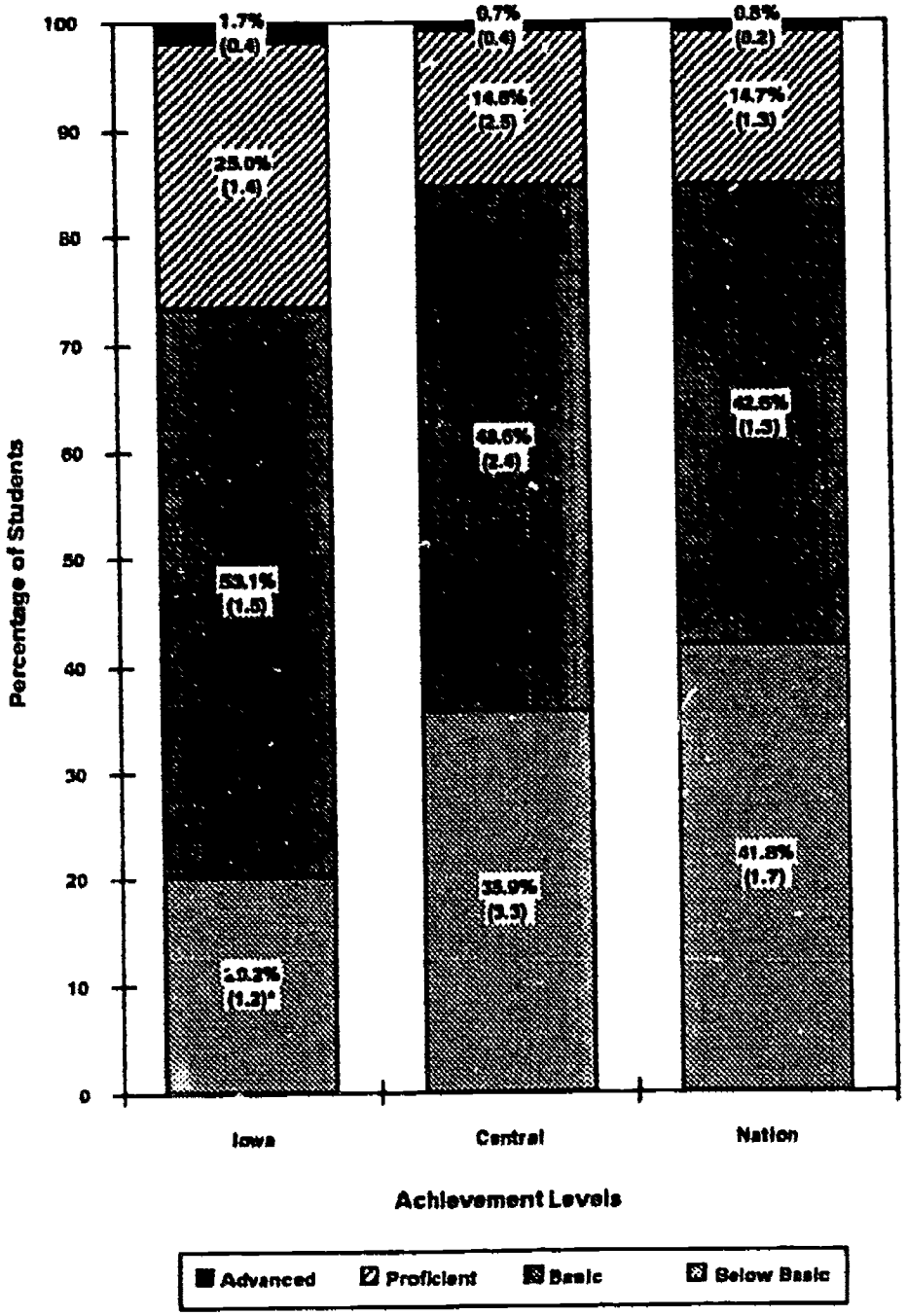
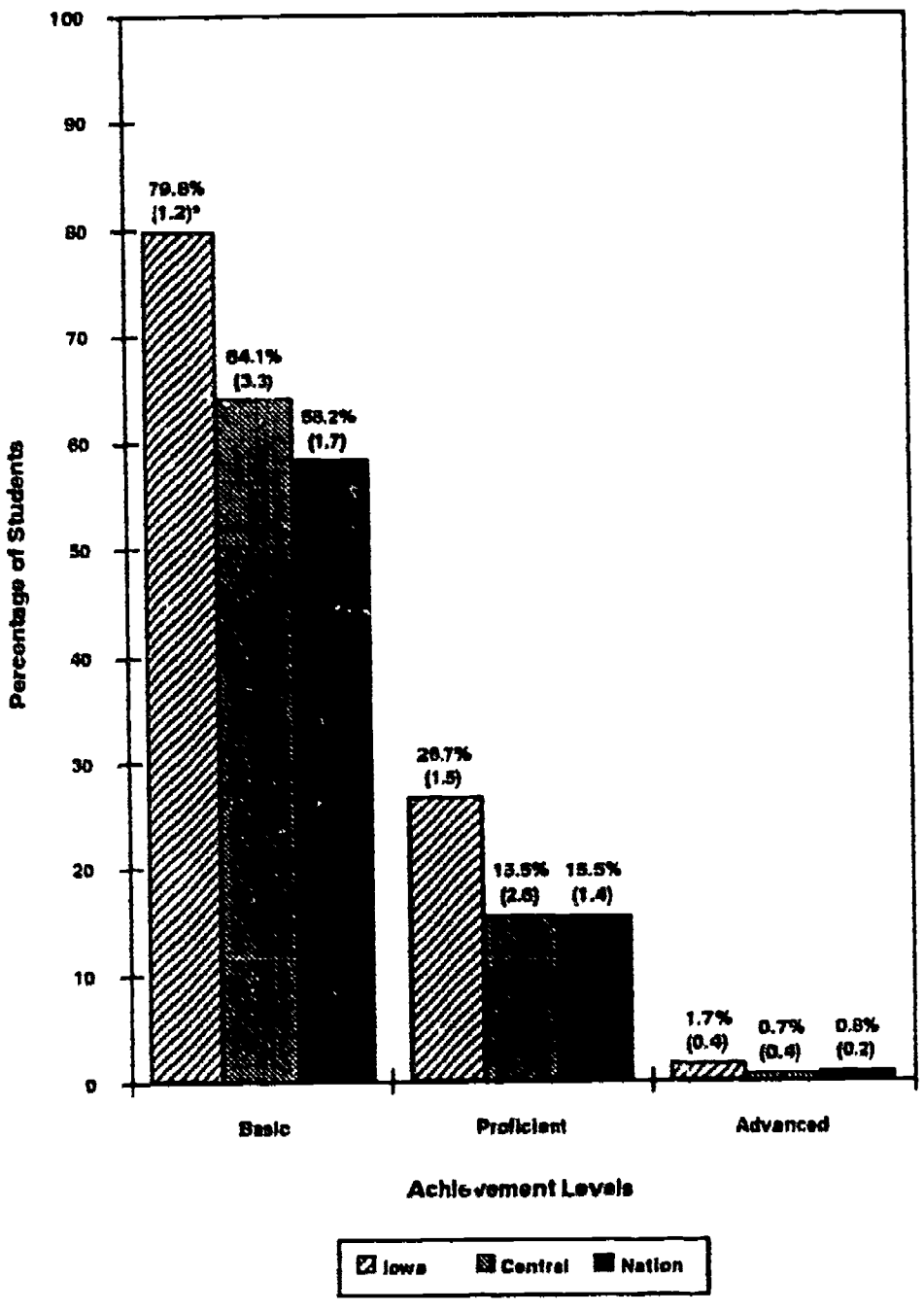


Figure 3.2-IA

Percentage of Students At or Above Grade 8 Achievement Levels for Iowa



* Standard errors are shown in parentheses

The results for Iowa have also been tabulated by gender, race/ethnicity, type of community, and parents' education.[1] Tables 3.1-IA through 3.4-IA present these findings for Iowa and the most significant relationships are summarized below.

Male students in Iowa are more likely than female students to be at or above the proficient level (see Table 3.1-IA). There are no significant differences, however, in the percentages of males and females at or above the basic and advanced levels. Iowa students of both genders are far more likely than their regional or national counterparts to be at or above the basic and proficient levels.

Whites and Hispanics are the major race/ethnic groups in the Iowa sample and the percentage of White students reaching the basic and proficient levels is higher than that for the Hispanics (see Table 3.2-IA). A larger percent of White students reach the basic and proficient levels in Iowa than in the Central region or the nation as a whole.

In Iowa, students from advantaged urban communities are more likely to be at or above the basic, proficient, and advanced levels than those students from all other types of communities. Students from disadvantaged communities in Iowa are less likely to be at or above the basic and proficient levels than students from extreme rural and "other" communities (see Table 3.3-IA). In most cases, students from the various types of communities in Iowa more likely to be performing at or above the basic level than students from similar communities across the nation. Students from extreme rural and "other" communities are also more likely to be at or above the proficient level than their national counterpoints.

In Iowa, as in the rest of the nation, student performance is strongly related to parental education. Students in Iowa whose parents have some schooling beyond high school (college degrees or some education after high school) are more likely to reach the basic and proficient levels than those students whose parents did not go beyond high school (see Table 3.4-IA). Students whose parents are high school graduates are also more likely to be at or above the

[1] See Appendix B of *The Levels of Mathematics Achievement, Volume I* for complete definitions of these subpopulations.

Table 3.2-IA

Percentage of Students At or Above Achievement Levels By Race/Ethnicity 1990 NAEP Mathematics Assessment

Iowa

RACE/ETHNICITY	GRADE 8 ACHIEVEMENT LEVEL		
	Basic	Proficient	Advanced
White			
Iowa	82.1 (1.3)	28.0 (1.6)	1.8 (0.4)
Central	72.9 (3.3)	18.8 (2.8)	0.9 (0.5)
Nation	68.7 (2.0)	19.4 (1.7)	1.1 (0.4)
Black			
Iowa	*** (***)	*** (***)	*** (***)
Central †	17.4 (3.0)	1.2 (1.2)	0.0 (0.0)
Nation	24.9 (2.5)	3.7 (1.4)	0.0 (0.0)
Hispanic			
Iowa	48.4 (6.2)	9.4 (2.9)	0.0 (0.0)
Central	*** (***)	*** (***)	*** (***)
Nation	34.4 (4.3)	4.1 (1.4)	0.0 (0.0)
Asian/Pacific Islander			
Iowa	*** (***)	*** (***)	*** (***)
Central	*** (***)	*** (***)	*** (***)
Nation †	76.6 (6.0)	38.1 (5.8)	3.4 (1.8)
American Indian			
Iowa	*** (***)	*** (***)	*** (***)
Central	*** (***)	*** (***)	*** (***)
Nation †	39.3 (14.9)	2.8 (2.7)	0.0 (0.0)
Total			
Iowa	79.8 (1.2)	26.7 (1.5)	1.7 (0.4)
Central	64.1 (3.3)	15.5 (2.6)	0.7 (0.4)
Nation	58.2 (1.7)	15.5 (1.4)	0.8 (0.2)

The standard errors of the estimated percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. When the proportion of students is either 0 percent or 100 percent, the standard error is inestimable.

† Interpret with caution--the nature of the sample does not allow accurate determination of the variability of the results for this subgroup.

*** Sample size insufficient to permit reliable estimate. There were fewer than 62 students.

Table 3.4-IA

Percentage of Students At or Above Achievement Levels By Parents' Education 1990 NAEP Mathematics Assessment

Iowa

PARENTS' EDUCATION	GRADE 8 ACHIEVEMENT LEVEL		
	Basic	Proficient	Advanced
Did Not Finish High School			
Iowa	55.6 (5.8)	7.4 (2.5)	0.0 (0.0)
Central	*** (***)	*** (***)	*** (***)
Nation	30.8 (3.4)	2.0 (0.9)	0.0 (0.0)
Graduated High School			
Iowa	72.3 (2.7)	15.2 (1.5)	0.6 (0.4)
Central	59.1 (4.2)	10.8 (3.4)	0.2 (0.7)
Nation	49.4 (2.5)	7.1 (1.5)	0.1 (0.3)
Some Education After High School			
Iowa	85.9 (2.2)	31.0 (2.3)	1.4 (0.6)
Central	70.8 (5.5)	18.4 (3.8)	1.7 (1.7)
Nation	65.4 (2.6)	16.9 (1.8)	1.2 (0.7)
Graduated College			
Iowa	86.1 (1.3)	35.6 (2.7)	3.0 (0.7)
Central	73.4 (4.1)	21.8 (4.3)	0.9 (1.0)
Nation	73.8 (2.1)	25.9 (2.2)	1.5 (0.5)
Total			
Iowa	79.8 (1.2)	26.7 (1.5)	1.7 (0.4)
Central	64.1 (3.3)	15.5 (2.6)	0.7 (0.4)
Nation	58.2 (1.7)	15.5 (1.4)	0.8 (0.2)

The standard errors of the estimated percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. When the proportion of students is either 0 percent or 100 percent, the standard error is inestimable. Not all students were able to report parents' education. Nationwide, 8 percent of the students in Grade 8 responded "I don't know" when asked about parents' highest level of education. Data for these students, however, are included in the "totals" for each grade.

*** Sample size insufficient to permit reliable estimate. There were fewer than 62 students.

basic and proficient levels than students whose parents did not finish high school. At every level of parental education, students from Iowa are more likely to reach the basic and proficient levels than their national counterparts. In most cases, they are also more likely to be at or above the basic and proficient levels than their counterparts in the Central region.

Section 2

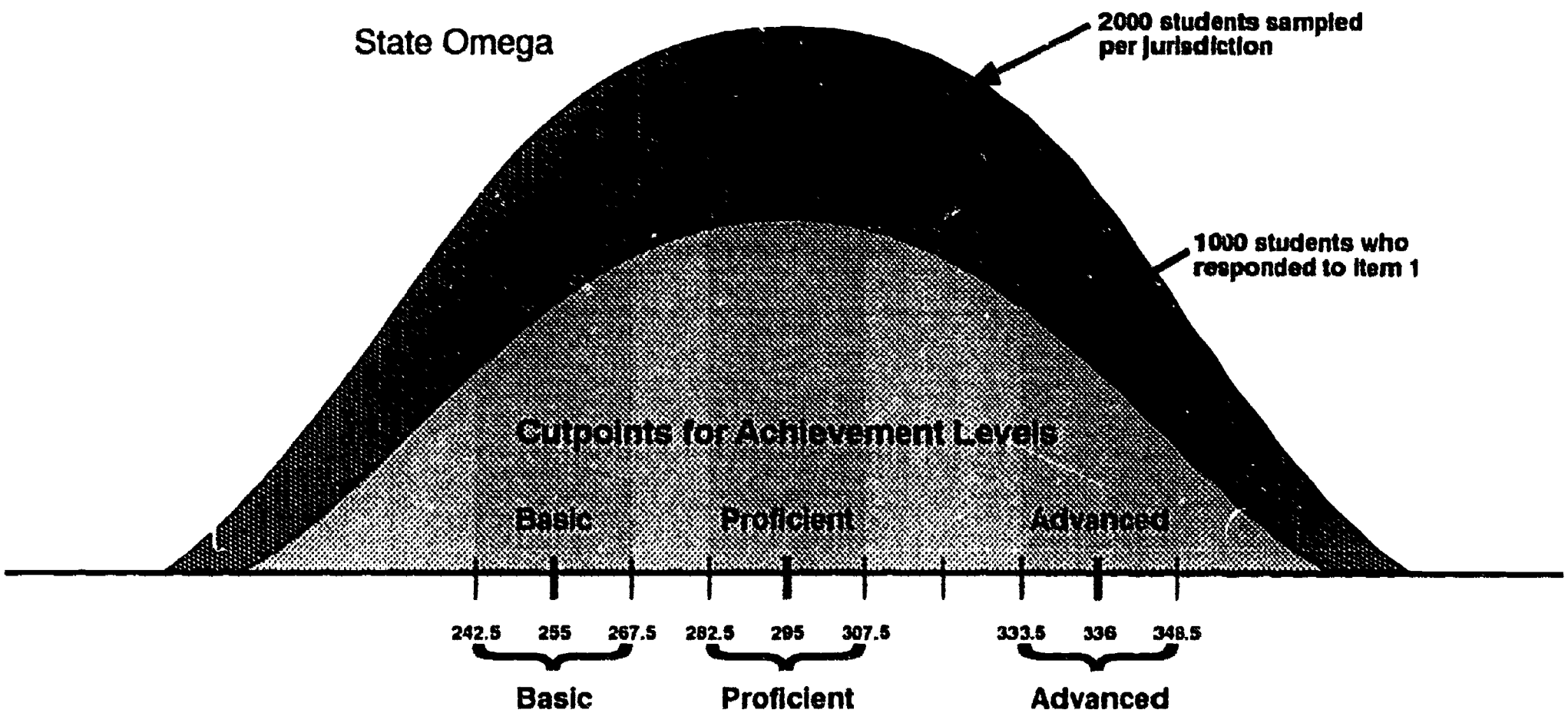
Explanation of Results for Released Items

The tables in the following Sections provide information on the performance of the students on individual released NAEP items for each jurisdiction. The definitions below have been provided to assist readers i the interpretation of these data.

Column Label	Read and interpret as follows:
NAEP ID	A seven-character alpha-numeric code that can be matched to the code appearing next to each item in Section 1 of *The Levels of Mathematics Achievement, Volume II.*
Description	A brief description of the item context. The full text of all released items for Grade 8 is presented in Section 1 of *The Levels of Mathematics Achievement, Volume II.*
	The abbreviation "N" refers tot he number of students in a jurisdiction who responded to particular items. Note that even through the number of students sampled in each jurisdiction was approximately 2000, because of the matrix sampling procedures, the number of students who responded to any given item was approximately half the total number sampled. The abbreviation "PCT" refers to the percentage of students in this group who gave the correct answer to the item.
	These data are from the State Aggregate Comparison (SAC) Sample and should be used in all comparisons of state and national results. The SAC sample was created from the public schools in the winter half-sample of the National Assessment to adjust for differences in administration of the National Assessment and the Trial State Assessment.

Correct at Basic Level (255)	The abbreviation "N" refers to the number of students whose scale scores were between 242.5 and 267.5, i.e., 12.5 scale score units around the Basic cut point. (See Figure 1 below.) The abbreviation "PCT" refers to the percentage of students in this group who gave the correct answer to the item.
Correct at Proficient Level (295)	The abbreviation "N" refers to the number of students whose scale scores were between 282.5 and 307.5, i.e., 12.5 scale score units around the Proficient cut point. (See Figure 1 below.) The abbreviation "PCT" refers to the percentage of students in this group who gave the correct answer to the item.
Correct at Advanced Level (336)	The abbreviation "N" refers to the number of students who scale scores were between 323.5 and 348.5, i.e., 12.5 scale score units around the Advanced cut point. (See Figure 1 below.) The abbreviation "PCT" refers to the percentage of students in this group who gave the correct answer to the item.

Figure 1: Relationship Between Samples Used for Released Item Results and Entire State Sample



Section 3

National and Regional Results for Grade 8 Released Items

NAEP 1990 TRIAL STATE ASSESSMENT - NATIONAL COMPARISON SAMPLE - NATION
RESULTS FOR RELEASED ITEMS

NAEPID	DESCRIPTION	CORRECT OVERALL		CORRECT AT BASIC LEVEL		CORRECT AT PROFICIENT LEVEL		CORRECT AT ADVANCED LEVEL	
		N	PCT	N	PCT	N	PCT	N	PCT
N276803	59 + 46 + 82 + 68 = 255 (NO CALCULATOR) (RATER 1)	1233	78%	364	74%	207	87%	19	100%
N277602	604 - 207 = 397 (NO CALCULATOR) (RATER 1)	1233	84%	364	85%	207	93%	19	87%
N267201	PENCIL LENGTH SHOWN IS 3 3/4 TO NEAREST 4TH INCH	1233	81%	364	75%	207	98%	19	100%
N250901	80 BOXES OF ORANGES PICKED ON THURSDAY (GRAPH)	1233	89%	364	87%	207	95%	19	100%
N250902	MORE LEMONS ON WED THAN ORANGES/GFRUIT (GRAPH)	1233	71%	364	72%	207	92%	19	100%
N286201	24 DIVIDED BY 6 SHOWS HOW TO PACK BASEBALLS	1232	74%	363	71%	207	94%	19	100%
N256101	THE VALUE OF N + 5 WHEN N = 3 IS 8 (RATER 1)	1231	74%	363	75%	207	93%	19	88%
N250201	BAG WITH 10 MARBLES BEST CHANCE TO GET RED ONE	1231	82%	363	85%	207	94%	19	90%
N265201	USE CENTIMETER NOT M OR KM FOR PENCIL LENGTH	1229	90%	363	91%	207	99%	19	100%
N274801	.35 CHANGED TO A PERCENT IS 35%	1229	76%	363	70%	207	89%	19	100%
N238801	125% OF 10 IS GREATER THAN 10	1228	53%	362	45%	207	74%	19	97%
N253701	2ND SET OF LINE SEGMENTS CANNOT MAKE A TRIANGLE	1228	68%	362	67%	207	79%	19	100%
N266602	WRITE 3 3/10 AS 3.3 (RATER 1)	1226	49%	361	39%	207	75%	19	79%
N275301	OF NUMBERS GIVEN, 5 IS COMMON FACTOR OF 10 AND 15	1225	82%	361	82%	207	85%	19	97%
N269901	THE FOURTH FIGURE SHOWN IS NOT A PARALLELOGRAM	1225	67%	361	61%	207	89%	19	94%
N265901	ONE LITER IS 1000 MILILITERS	1225	50%	361	43%	207	69%	19	98%
N252101	PERIMETER OF RECTANGLE 8M X 5M IS 26 METERS	1224	58%	360	53%	207	78%	19	84%
N260101	COMPUTE +6, -12 =-6	1223	63%	359	58%	207	91%	19	100%
N263501	AVERAGE AGE OF CHILDREN IS 7	1215	59%	359	53%	207	87%	19	100%
N264701	X TIMES 1 = X TRUE WHEN ANY NO. SUBSTITUTED FOR X	1214	38%	359	23%	207	74%	19	98%
N286301	.075 IS BETWEEN .07 AND .08	1214	51%	359	41%	207	86%	19	94%
N254602	SECOND LINES SHOWN ARE PERPENDICULAR	1206	37%	354	31%	207	55%	19	74%
N255701	2X + 3Y + 4X = 6X + 3Y	1201	34%	352	22%	207	61%	19	95%
M015401	150 MINUTES = 2 1/2 HOURS	1252	58%	339	50%	237	77%	26	100%
M015501	IF 2/25 = N/500 THEN N = 40	1252	48%	339	37%	237	73%	26	93%
M015601	STRAIGHT LINE CAN'T BE DRAWN ON SURFACE OF SPHERE	1252	58%	339	57%	237	68%	26	88%
M015701	LIQUID LET OUT OF THE TUBE: 15 MILLILITERS	1251	92%	339	93%	237	99%	26	100%
M015801	AVERAGE WGHT 50 TOMATOES=2.36 COMBINED WGHT=118	1249	44%	339	33%	236	63%	26	94%
M015901	FIGURE A BEST ILLUSTRATES THE STATEMENT	1249	43%	339	36%	236	51%	26	92%
M016001	LEAST WHOLE NUMBER X FOR WHICH 2X > 11 IS 6	1249	43%	339	28%	236	68%	26	85%
M016101	9 CHIPS IN BAG - PROBABILITY DRAW EVEN CHIP = 4/9	1247	55%	339	49%	236	78%	26	100%
M016201	BOX 48 CUBIC INCHES-MEASUREMENT REPRESENTS VOLUME	1247	41%	339	29%	236	64%	26	79%
M016301	FLIP TRIANGLE OVER LINE L AND GET FIGURE E	1247	58%	339	50%	236	73%	26	84%
M016401	DIST. BTWN MIDPOINT OF MN & MIDPOINT OF PQ = 30 CM	1246	27%	339	18%	236	41%	26	84%
M016501	120 IS LEAST COMMON MULTIPLE OF 8, 12 AND 15	1242	17%	338	12%	236	25%	26	41%
M016601	DIAGONAL MEASUREMENT OF TV SCREEN SHOWN IS 50 INCH	1238	25%	338	16%	236	42%	26	46%
M016701	FIGURE A CONTAINS PERPENDICULAR LINE SEGMENTS	1232	19%	337	13%	235	24%	26	64%
M016801	LENGTH OF RECTANGLE CAN BE EXPRESSED AS L - 3	1227	14%	335	5%	235	28%	26	53%
M016901	IF PATTERN CONTINUES 100TH FIG. WILL HAVE 201 DOTS	1208	33%	331	21%	234	49%	26	81%
M016902	EXPLAIN HOW GOT ANSWER FOR QUESTION 16 (RATER 1)	1191	14%	328	6%	233	25%	26	51%
M017001	15 GIRLS, 11 BOYS - PROBABILITY SELECT BOY = 11/26	1173	37%	324	34%	230	49%	26	88%
M027031	(150 / 3) + (6 X 2) = 62	1197	94%	341	96%	202	97%	22	100%
M027131	IF N + N + N = 60, THEN VALUE OF N = 20	1196	88%	341	91%	202	99%	22	100%
M027231	THE LINE SEGMENT IS A DIAMETER IN CIRCLE A	1196	74%	341	71%	202	85%	22	95%
M027331	PRODUCT OF 3.12 AND 8 CUBED = 1597.44 (RATER 1)	1196	32%	341	20%	202	60%	22	91%
M027431	FIGURE THAT HAS 2 CIRCULAR BASES - A CYLINDER	1195	66%	341	64%	202	86%	22	89%
M027531	3 X (BOX + 5) = 30 BOX = 5	1192	68%	340	62%	202	90%	22	95%
M027631	MODEL: IF 15 FT = 3 INCHES, THEN 35 FT = 7 INCHES	1189	56%	339	50%	202	87%	22	100%
M027731	TO GET 2ND NUMBER IN PAIRS: MULT. BY 2 AND ADD 1	1186	47%	339	41%	202	75%	22	100%
M027831	OBJECT 30 LBS-EARTH WEIGHS 5 LBS ON MOON (RATER 1)	1182	47%	337	39%	202	79%	22	100%
M027931	COST TO RENT MOTORBIKE: FILL IN TABLE (RATER 1)	1174	44%	334	36%	202	74%	22	96%
M028031	($14.95 + $5.85 + $9.70) X .06 = $32.33	1149	44%	328	35%	200	61%	22	96%
M028131	12 DIVIDES N W/O REMAINDER, ALSO 2,3,4,6 (RATER 1)	1128	31%	321	26%	196	48%	22	55%
M028231	BEEF = $2.59 /LB - 0.93 LBS COST $2.41	1106	43%	313	41%	194	60%	22	96%
M028331	RATIO LENGTH SIDE EQUIL TRIANGLE TO PERIMETER 1:3	1074	42%	303	38%	192	52%	22	74%
M028431	PLOT THE POINTS (5,2) ON THE GRID SHOWN (RATER 1)	1047	30%	296	22%	187	48%	22	76%
M028531	MAKE A CIRCLE GRAPH TO ILLUSTRATE DATA (RATER 1)	1017	71%	290	75%	178	94%	21	100%
M028631	MEAT COST: (214.964/52)X2.53 = $10458.83 (RATER 1)	914	13%	263	6%	152	28%	21	53%
M028731	50 CENTS TO 60 CENTS - PERCENT INCREASE IS 20	861	16%	256	5%	148	28%	20	80%
M028831	RECTANGLE: LENGTH IS 4, WIDTH IS = ? 1/4	800	17%	244	14%	136	11%	17	47%
M028931	IF 10.3/5.62 = N/4.78 THEN 8.76 IS CLOSEST TO N	738	44%	232	39%	127	55%	15	51%

NAEP 1990 TRIAL STATE ASSESSMENT - NATIONAL COMPARISON SAMPLE - CENTRAL
RESULTS FOR RELEASED ITEMS

NAEPID	DESCRIPTION	CORRECT OVERALL		CORRECT AT BASIC LEVEL		CORRECT AT PROFICIENT LEVEL		CORRECT AT ADVANCED LEVEL	
		N	PCT	N	PCT	N	PCT	N	PCT
N276803	59 + 46 + 82 + 68 = 255 (NO CALCULATOR) (RATER 1)	276	75%	85	59%	44	87%	3	100%
N277602	604 - 207 = 397 (NO CALCULATOR) (RATER 1)	276	89%	85	90%	44	95%	3	100%
N267201	PENCIL LENGTH SHOWN IS 3 3/4 TO NEAREST 4TH INCH	276	82%	85	72%	44	98%	3	100%
N250901	80 BOXES OF ORANGES PICKED ON THURSDAY (GRAPH)	276	86%	85	79%	44	97%	3	100%
N250902	MORE LEMONS ON WED THAN ORANGES/GFRUIT (GRAPH)	276	70%	85	75%	44	91%	3	100%
N266201	24 DIVIDED BY 6 SHOWS HOW TO PACK BASEBALLS	276	76%	85	72%	44	95%	3	100%
N256101	THE VALUE OF N + 5 WHEN N = 3 IS 8 (RATER 1)	276	72%	85	66%	44	95%	3	100%
N250201	BAG WITH 10 MARBLES BEST CHANCE TO GET RED ONE	276	83%	85	87%	44	96%	3	77%
N265201	USE CENTIMETER NOT M OR KM FOR PENCIL LENGTH	276	90%	85	93%	44	100%	3	100%
N274901	.35 CHANGED TO A PERCENT IS 35%	276	76%	85	76%	44	86%	3	100%
N268801	125% OF 10 IS GREATER THAN 10	276	56%	85	52%	44	79%	3	100%
N253701	2ND SET OF LINE SEGMENTS CANNOT MAKE A TRIANGLE	276	67%	85	71%	44	83%	3	100%
N266602	WRITE 3 3/10 AS 3.3 (RATER 1)	274	45%	84	29%	44	79%	3	100%
N278301	OF NUMBERS GIVEN, 5 IS COMMON FACTOR OF 10 AND 15	274	80%	84	81%	44	93%	3	100%
N269901	THE FOURTH FIGURE SHOWN IS NOT A PARALLELOGRAM	274	65%	84	52%	44	97%	3	100%
N265901	ONE LITER IS 1000 MILLILITERS	274	52%	84	50%	44	69%	3	100%
N262101	PERIMETER OF RECTANGLE 8M X 5M IS 26 METERS	274	54%	84	44%	44	76%	3	100%
N260101	COMPUTE +6, -12 =-6	274	69%	84	65%	44	91%	3	100%
N263501	AVERAGE AGE OF CHILDREN IS 7	270	54%	84	36%	44	75%	3	100%
N264701	X TIMES 1 = X TRUE WHEN ANY NO. SUBSTITUTED FOR X	270	36%	84	18%	44	78%	3	100%
N266301	.075 IS BETWEEN .07 AND .08	270	54%	84	49%	44	88%	3	100%
N254602	SECOND LINES SHOWN ARE PERPENDICULAR	267	30%	82	27%	44	43%	3	77%
N255701	2X + 3Y + 4X = 6X + 3Y	266	31%	81	13%	44	48%	3	100%
M015401	150 MINUTES = 2 1/2 HOURS	272	61%	72	53%	57	78%	8	100%
M015501	IF 2/25 = N/500 THEN N = 40	272	51%	72	37%	57	74%	8	100%
M015601	STRAIGHT LINE CAN'T BE DRAWN ON SURFACE OF SPHERE	272	57%	72	62%	57	68%	8	100%
M015701	LIQUID LET OUT OF THE TUBE: 15 MILLILITERS	272	94%	72	90%	57	98%	8	100%
M015801	AVERAGE WGHT 50 TOMATOES=2.36 COMBINED WGHT=118	272	46%	72	38%	57	57%	8	88%
M015901	FIGURE A BEST ILLUSTRATES THE STATEMENT	272	46%	72	42%	57	56%	8	90%
M016001	LEAST WHOLE NUMBER X FOR WHICH 2X > 11 IS 6	272	43%	72	27%	57	71%	8	76%
M016101	9 CHIPS IN BAG - PROBABILITY DRAW EVEN CHIP = 4/9	272	56%	72	46%	57	84%	8	100%
M016201	BOX 48 CUBIC INCHES-MEASUREMENT REPRESENTS VOLUME	272	40%	72	24%	57	70%	8	66%
M016301	FLIP TRIANGLE OVER LINE L AND GET FIGURE E	272	62%	72	58%	57	79%	8	100%
M016401	DIST. BTWN MIDPOINT OF MN & MIDPOINT OF PQ = 30 CM	272	26%	72	18%	57	38%	8	87%
M016501	120 IS LEAST COMMON MULTIPLE OF 8, 12 AND 15	270	16%	72	16%	57	21%	8	38%
M016601	DIAGONAL MEASUREMENT OF TV SCREEN SHOWN IS 50 INCH	269	24%	72	24%	57	30%	8	54%
M016701	FIGURE A CONTAINS PERPENDICULAR LINE SEGMENTS	269	15%	72	9%	57	19%	8	66%
M016801	LENGTH OF RECTANGLE CAN BE EXPRESSED AS L - 3	269	11%	72	4%	57	20%	8	57%
M016901	IF PATTERN CONTINUES 100TH FIG. WILL HAVE 201 DOTS	266	33%	71	22%	57	43%	8	74%
M016902	EXPLAIN HOW GOT ANSWER FOR QUESTION 16 (RATER 1)	263	14%	70	6%	57	21%	8	55%
M017001	15 GIRLS, 11 BOYS - PROBABILITY SELECT BOY = 11/26	259	33%	69	32%	57	42%	8	63%
M027031	(150 / 3) + (6 X 2) = 62	271	94%	68	94%	52	100%	6	100%
M027131	IF N + N + N = 60, THEN VALUE OF N = 20	271	92%	68	90%	52	100%	6	100%
M027231	THE LINE SEGMENT IS A DIAMETER IN CIRCLE A	271	71%	68	71%	52	73%	6	83%
M027331	PRODUCT OF 3.12 AND 8 CUBED = 1597.44 (RATER 1)	271	35%	68	24%	52	65%	6	100%
M027431	FIGURE THAT HAS 2 CIRCULAR BASES - A CYLINDER	271	71%	68	65%	52	89%	6	100%
M027531	3 X (BOX + 5) = 30 BOX = 5	271	74%	68	64%	52	93%	6	100%
M027631	MODEL: IF 15 FT = 3 INCHES, THEN 35 FT = 7 INCHES	271	62%	68	59%	52	86%	6	100%
M027731	TO GET 2ND NUMBER IN PAIRS: MULT. BY 2 AND ADD 1	269	53%	68	41%	52	83%	6	100%
M027831	OBJECT 30 LBS-EARTH WEIGHS 5 LBS ON MOON (RATER 1)	268	54%	68	49%	52	77%	6	100%
M027931	COST TO RENT MOTORBIKE: FILL IN TABLE (RATER 1)	267	48%	68	32%	52	77%	6	100%
M028031	($14.95 + $5.85 + $9.70) X .06 = $32.33	263	46%	67	35%	52	60%	6	100%
M028131	12 DIVIDES N W/O REMAINDER, ALSO 2,3,4,6 (RATER 1)	260	35%	65	27%	52	44%	6	46%
M028231	BEEF = $2.59 /LB - 0.93 LBS COST $2.41	258	46%	64	50%	52	56%	6	100%
M028331	RATIO LENGTH SIDE EQUIL TRIANGLE TO PERIMETER 1:3	248	43%	62	37%	51	50%	6	51%
M028431	PLOT THE POINTS (5,2) ON THE GRID SHOWN (RATER 1)	244	33%	62	23%	50	42%	6	82%
M028531	MAKE A CIRCLE GRAPH TO ILLUSTRATE DATA (RATER 1)	241	74%	60	76%	49	94%	6	100%
M028631	MEAT COST: (214,964/52)X2.53 = $10458.83 (RATER 1)	225	18%	58	4%	44	40%	6	66%
M028731	50 CENTS TO 60 CENTS - PERCENT INCREASE IS 20	214	18%	57	4%	42	31%	6	83%
M028831	RECTANGLE: LENGTH IS 4, WIDTH IS = 2 1/4	200	15%	55	14%	40	5%	5	37%
M028931	IF 10.3/5.62 = N/4.78 THEN 8.76 IS CLOSEST TO N	187	51%	54	46%	36	60%	5	23%

Section 4

State Results for Grade 8 Released Items

NAEP 1990 TRIAL STATE ASSESSMENT - IOWA
RESULTS FOR RELEASED ITEMS

NAEPID	DESCRIPTION	NATION		STATE							
		CORRECT OVERALL (SAC)		CORRECT OVERALL		CORRECT AT BASIC LEVEL		CORRECT AT PROFICIENT LEVEL		CORRECT AT ADVANCED LEVEL	
		N	PCT	N	PCT	N	PCT	N	PCT	N	PCT
N276809	59 + 46 + 82 + 68 = 255 (NO CALCULATOR) (RATER 1)	1239	78%	1061	80%	229	78%	313	91%	64	91%
N277602	604 - 207 = 397 (NO CALCULATOR) (RATER 1)	1233	84%	1060	88%	225	83%	313	94%	64	89%
N267201	PENCIL LENGTH SHOWN IS 3 3/4 TO NEAREST 4TH INCH	1233	81%	1060	90%	225	84%	313	97%	64	89%
N250801	80 BOXES OF ORANGES PICKED ON THURSDAY (GRAPH)	1233	89%	1060	92%	225	89%	313	96%	64	97%
N250802	MORE LEMONS ON WED THAN ORANGES/GFRUIT (GRAPH)	1233	71%	1060	87%	225	77%	313	96%	64	97%
N266301	24 DIVIDED BY 6 SHOWS HOW TO PACK BASEBALLS	1232	74%	1060	85%	225	77%	313	93%	64	98%
N256101	THE VALUE OF N + 5 WHEN N = 3 IS 8 (RATER 1)	1231	74%	1060	84%	225	78%	313	96%	64	98%
N260201	BAG WITH 10 MARBLES BEST CHANCE TO GET RED ONE	1231	82%	1060	89%	225	85%	313	96%	64	92%
N255201	USE CENTIMETER NOT M OR KM FOR PENCIL LENGTH	1229	90%	1060	94%	225	92%	313	97%	64	100%
N274601	.35 CHANGED TO A PERCENT IS 35%	1229	76%	1060	82%	225	74%	313	93%	64	98%
N258901	125% OF 10 IS GREATER THAN 10	1228	53%	1060	66%	225	50%	313	76%	64	99%
N259701	2ND SET OF LINE SEGMENTS CANNOT MAKE A TRIANGLE	1228	69%	1060	75%	225	68%	313	84%	64	96%
N266602	WRITE 3 3/10 AS 3.3 (RATER 1)	1226	49%	1060	61%	225	46%	313	74%	64	89%
N275301	OF NUMBERS GIVEN, 5 IS COMMON FACTOR OF 10 AND 15	1225	82%	1060	86%	225	85%	313	95%	64	92%
N255901	THE FOURTH FIGURE SHOWN IS NOT A PARALLELOGRAM	1225	67%	1060	74%	225	69%	313	9%	64	96%
N265901	ONE LITER IS 1000 MILLILITERS	1225	50%	1060	57%	225	37%	313	. %	64	88%
N252101	PERIMETER OF RECTANGLE 8M X 5M IS 26 METERS	1224	58%	1060	62%	225	50%	313	88%	64	94%
N260101	COMPUTE +6, -12 =-6	1223	63%	1060	77%	225	64%	313	90%	64	99%
N263501	AVERAGE AGE OF CHILDREN IS 7	1215	59%	1059	69%	225	50%	313	86%	64	97%
N264701	X TIMES 1 = X TRUE WHEN ANY NO. SUBSTITUTED FOR X	1214	38%	1059	56%	225	36%	313	75%	64	99%
N266301	.075 IS BETWEEN .07 AND .08	1214	51%	1059	68%	225	46%	313	85%	64	98%
N254602	SECOND LINES SHOWN ARE PERPENDICULAR	1206	37%	1036	43%	224	23%	312	59%	63	84%
N255701	2X + 3Y + 4X = 6X + 3Y	1201	34%	1053	39%	224	16%	310	49%	63	94%
M015401	150 MINUTES = 2 1/2 HOURS	1252	68%	1054	68%	249	48%	327	74%	55	94%
M015501	IF 2/25 = N/500 THEN N = 40	1252	49%	1054	61%	249	41%	327	77%	55	94%
M015601	STRAIGHT LINE CAN'T BE DRAWN ON SURFACE OF SPHERE	1252	59%	1054	65%	249	57%	327	69%	55	89%
M015701	LIQUID LET OUT OF THE TUBE: 15 MILLILITERS	1251	92%	1054	96%	249	95%	327	99%	55	100%
M015901	AVERAGE WGHT 50 TOMATOES=2.36 COMBINED WGHT=118	1249	44%	1054	59%	249	40%	327	73%	55	89%
M015901	FIGURE A BEST ILLUSTRATES THE STATEMENT	1249	43%	1055	45%	249	33%	327	47%	55	85%
M016001	LEAST WHOLE NUMBER X FOR WHICH 2X > 11 IS 6	1249	43%	1055	54%	249	35%	327	66%	55	85%
M016101	9 CHIPS IN BAG - PROBABILITY DRAW EVEN CHIP = 4/9	1247	56%	1055	61%	249	41%	327	73%	55	91%
M016201	BOX 48 CUBIC INCHES-MEASUREMENT REPRESENTS VOLUME	1247	41%	1055	53%	249	34%	327	67%	55	82%
M016301	FLIP TRIANGLE OVER LINE L AND GET FIGURE E	1247	58%	1055	71%	249	60%	327	77%	55	92%
M016401	DIST. BTWN MIDPOINT OF MN & MIDPOINT OF PQ = 30 CM	1246	27%	1055	37%	249	16%	327	47%	55	96%
M016501	120 IS LEAST COMMON MULTIPLE OF 8, 12 AND 15	1242	17%	1054	22%	249	9%	327	26%	55	62%
M016601	DIAGONAL MEASUREMENT OF TV SCREEN SHOWN IS 50 INCH	1239	25%	1054	35%	249	19%	327	40%	55	78%
M016701	FIGURE A CONTAINS PERPENDICULAR LINE SEGMENTS	1232	18%	1054	22%	249	10%	327	30%	55	57%
M016801	LENGTH OF RECTANGLE CAN BE EXPRESSED AS '_ - 3	1227	14%	1054	19%	249	4%	327	24%	55	82%
M016901	IF PATTERN CONTINUES 100TH FIG. WILL HAVE 201 DOTS	1209	33%	1051	40%	249	20%	326	53%	54	85%
M016902	EXPLAIN HOW GOT ANSWER FOR QUESTION 16 (RATER 1)	1191	14%	1048	21%	247	7%	326	31%	54	56%
M017001	15 GIRLS, 11 BOYS - PROBABILITY SELECT BOY = 11/26	1173	37%	1044	38%	248	27%	325	40%	54	83%
M027031	(150 / 3) + (6 X 2) = 62	1197	94%	1071	98%	262	96%	297	98%	61	100%
M027131	IF N + N + N = 60, THEN VALUE OF N = 20	1196	88%	1071	93%	262	91%	297	98%	61	100%
M027231	THE LINE SEGMENT IS A DIAMETER IN CIRCLE A	1196	74%	1071	83%	262	74%	297	91%	61	94%
M027331	PRODUCT OF 3.12 AND 8 CUBED = 1597.44 (RATER 1)	1196	32%	1071	46%	262	23%	297	65%	61	90%
M027431	FIGURE THAT HAS 2 CIRCULAR BASES - A CYLINDER	1195	66%	1071	77%	262	69%	297	88%	61	97%
M027531	3 X (BOX + 5) = 30 BOX = 5	1192	69%	1071	81%	262	72%	297	89%	61	99%
M027631	MODEL: IF 15 FT = 3 INCHES, THEN 35 FT = 7 INCHES	1189	56%	1071	68%	262	47%	297	81%	61	99%
M027731	TO GET 2ND NUMBER IN PAIRS: MULT. BY 2 AND ADD 1	1188	47%	1071	60%	262	40%	297	69%	61	95%
M027831	OBJECT 30 LBS-EARTH WEIGHS 5 LBS ON MOON (RATER 1)	1182	47%	1070	61%	262	32%	297	80%	61	94%
M027931	COST TO RENT MOTORBIKE: FILL IN TABLE (RATER 1)	1174	44%	1069	61%	261	38%	297	79%	61	97%
M028031	($14.95 + $5.85 + $9.70) X .09 = $2.33	1149	44%	1063	52%	261	31%	297	69%	61	93%
M028131	12 DIVIDES N W/O REMAINDER, ALSO 2,3,4,6 (RATER 1)	1129	31%	1057	42%	257	23%	296	52%	61	74%
M028231	BEEF = $2.59 /LB - 0.93 LBS COST $2.41	1106	43%	1052	53%	255	36%	296	60%	61	92%
M028331	RATIO LENGTH SIDE EQUIL TRIANGLE TO PERIMETER 1:3	1074	42%	1041	43%	249	32%	285	50%	61	81%
M028431	PLOT THE POINTS (5,2) ON THE GRID SHOWN (RATER 1)	1047	30%	1034	39%	248	25%	283	51%	61	64%
M028531	MAKE A CIRCLE GRAPH TO ILLUSTRATE DATA (RATER 1)	1017	71%	1022	83%	245	75%	291	92%	61	98%
M028631	MEAT COST: (214,964/52)X2.53 = $10458.83 (RATER 1)	914	13%	967	19%	233	3%	269	27%	56	62%
M028731	50 CENTS TO 60 CENTS - PERCENT INCREASE IS 20	861	16%	899	20%	220	4%	256	23%	53	75%
M028831	RECTANGLE: LENGTH IS 4, WIDTH IS = 2 1/4	800	17%	838	20%	211	10%	238	19%	49	64%
M028931	IF 10.3/5.62 = N/4.79 THEN 8.76 IS CLOSEST TO N	738	44%	788	53%	203	44%	217	60%	44	82%

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"...the Board shall ... [identify] appropriate achievement goals for each age and grade in each subject area to be tested under the National Assessment."

Public Law 100-297