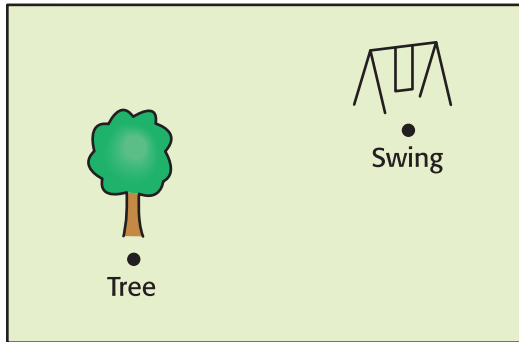


**14**

Use your centimeter ruler to help you answer this question.

Liza made the scale drawing shown below.



Key: 1 cm represents 5 feet

What is the shortest distance, in feet, from the tree to the swing?

- | | |
|-----------------|------------------|
| A 4 feet | C 20 feet |
| B 5 feet | D 25 feet |

15

Mike has x baseball cards. Tyrone has 3 times as many baseball cards as Mike. Frank has 20 baseball cards.

Which expression represents the total number of baseball cards Mike, Tyrone, and Frank have all together?

- A** $x + 3x + 20$
B $20 + 3x - x$
C $x + 3 + 20$
D $20 - 3x + x$

16

What is the value of the expression below when $x = 6$ and $y = 2$?

$$8x - y$$

- | | | | |
|----------|----------|----------|----------|
| 84 | 46 | 12 | 4 |
| A | B | C | D |



17

Which correctly describes the rule between x and y as shown in the table?

x	y
4	9
5	11
6	13
7	15

- A $y = x + 6 - 1$
- B $y = x \cdot x - 1$
- C $y = x + x - 1$
- D $y = x \cdot 2 + 1$

18

Which table of values satisfies the equation shown below?

$$y = x + 4$$

A

x	y
0	0
1	1
2	2
3	3

B

x	y
0	4
1	4
2	4
3	4

C

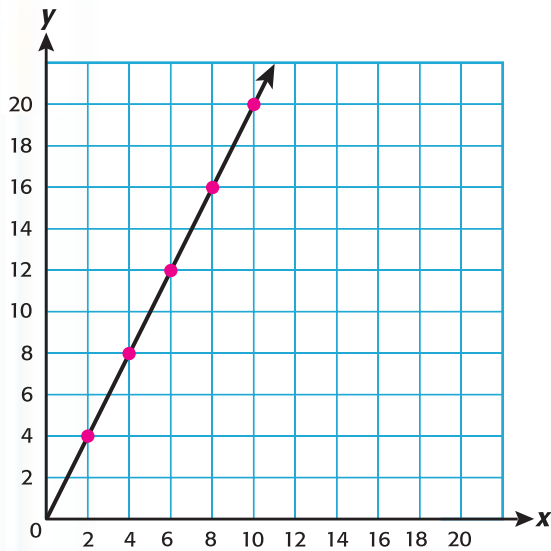
x	y
0	4
1	5
2	6
3	7

D

x	y
0	0
1	4
2	8
3	12

19

The graph below represents a linear equation.

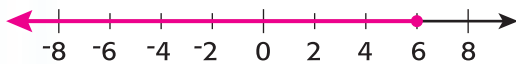


Using this graph, which value best represents the y -coordinate if the x -coordinate is 8?

- 4
A
- 14
B
- 16
C
- 18
D

20

Which inequality is best represented by the graph on the number line below?


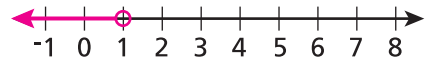
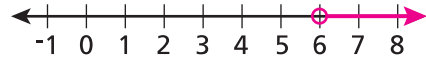
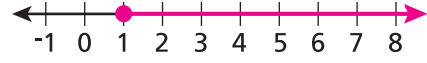


- A $x < 6$
- C $x \leq 6$
- B $x \geq 6$
- D $x > 6$

21

Which graph best represents the solution to the inequality shown?

$$\frac{m}{2} > 3$$

- A 
- B 
- C 
- D 

22

Philip has 18 video games. Emily has v video games. Together, Philip and Emily have a combined total of less than 30 video games.

Which inequality could be used to represent this situation?

- A $v - 18 > 30$
- B $v + 18 < 30$
- C $v - 18 < 30$
- D $v + 18 > 30$



23

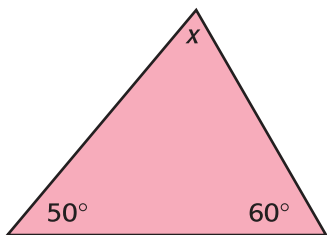
What value of n makes the equation below true?

$$4n = 220$$

- 50 55 216 220
A **B** **C** **D**

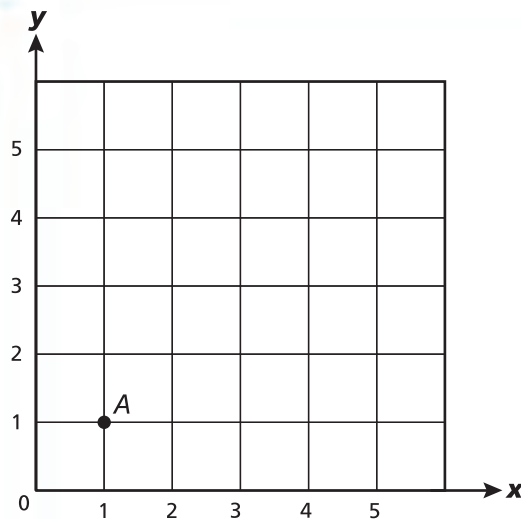
24

What should be the value for x in the triangle shown?



- 10° 40° 70° 90°
A **B** **C** **D**

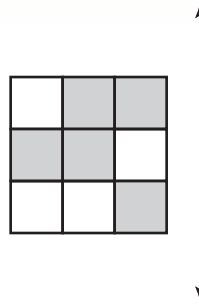
25



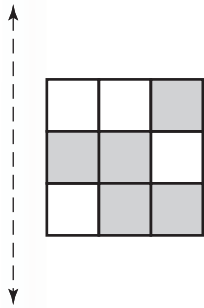
Point A is moved 1 unit to the right and 2 units up. What are the coordinates of its new location?

- (2, 1) (2, 3) (1, 3) (3, 2)
A **B** **C** **D**

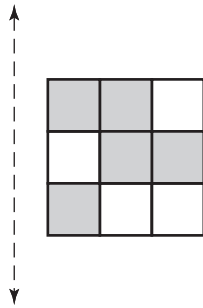
26



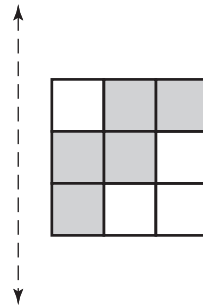
Which diagram shows a reflection over the vertical line in the drawing above?



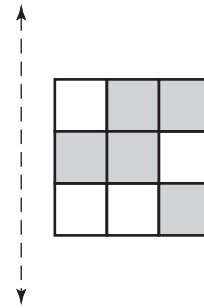
A



B



C

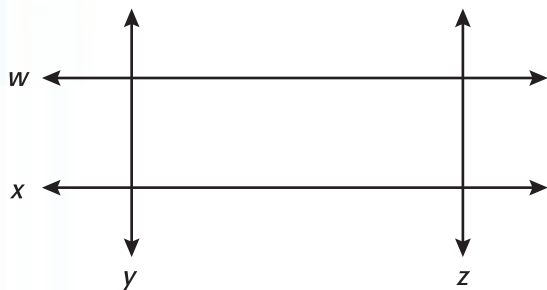


D



27

Lines w and x intersect lines y and z to form a rectangle as shown.



Which statement is true?

- A Line x is parallel to line y .
- B Line x is parallel to line z .
- C Line w is perpendicular to line y .
- D Line w is perpendicular to line x .

28

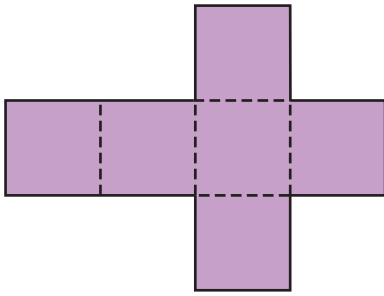


Which streets on this map appear to never intersect?

- A Talley and Franklin
- B Starlight and Pierce
- C Franklin and Holloway
- D Holloway and Starlight

29

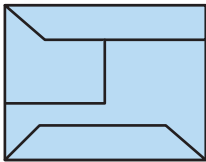
What three-dimensional figure would this pattern make if it were folded along the dashed line segments?



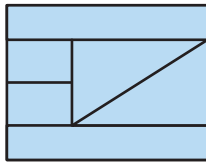
- A Rectangular pyramid
- B Square pyramid
- C Triangular prism
- D Cube

30

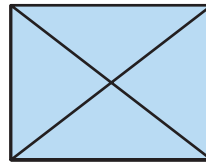
Which figure does *not* appear to contain two or more congruent shapes?



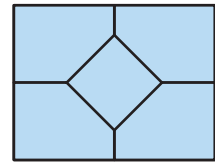
A



B



C

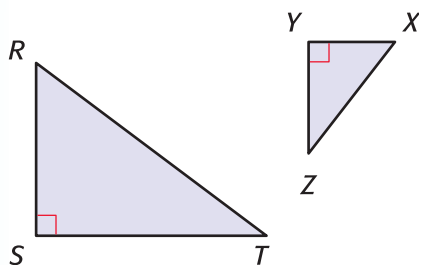


D



31

Triangle RST is similar to triangle XYZ .

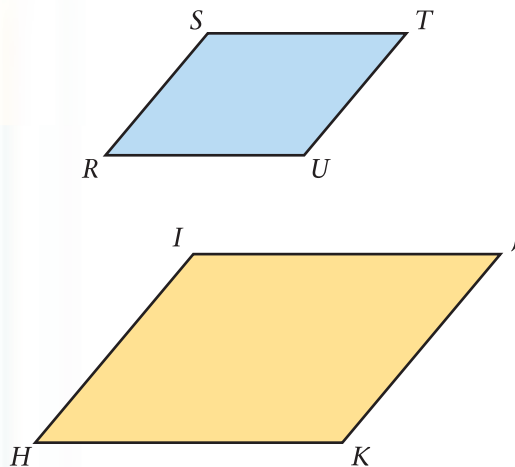


\overline{RS} corresponds to which side of triangle XYZ ?

- A** \overline{SR}
- B** \overline{YZ}
- C** \overline{XZ}
- D** \overline{XY}

32

Parallelogram $RSTU$ is similar to parallelogram $HIJK$.

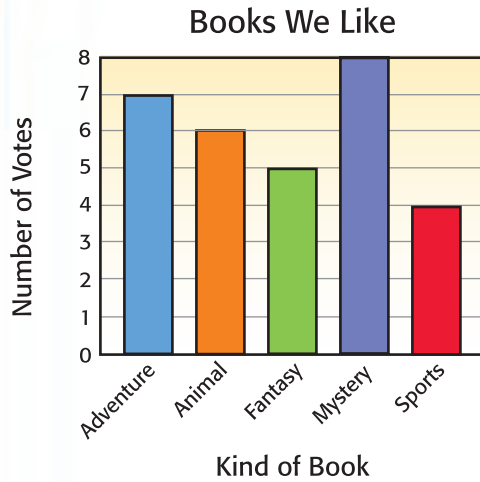


If the measure of $\angle RST$ is 130° , then what is the measure of $\angle HIJ$?

- A** 50°
- B** 130°
- C** 260°
- D** 520°

33

Mrs. Robbins' class voted for their favorite kinds of books to read.

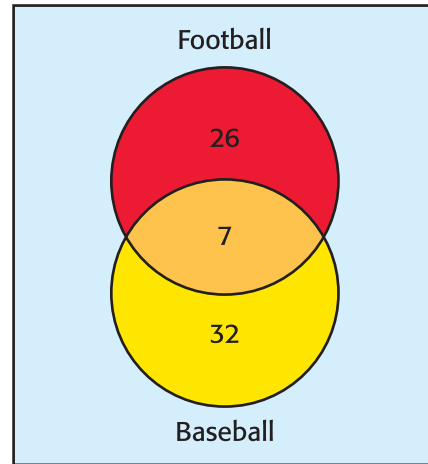


How many more students voted for books about adventures than books about sports?

- 0 1 2 3
A **B** **C** **D**

34

The Venn diagram below shows the number of students at Washington Elementary who play baseball and football.



How many students play baseball but *not* football?

- 39 33 32 26
A **B** **C** **D**



35

Trista made the chart below using the last names of her friends.

LAST NAMES
WILLIAMS
BANKS
SMITH
ANDRADE
GONZALEZ
CAREY

Which line plot represents the number of letters in each friend's last name?



A



C



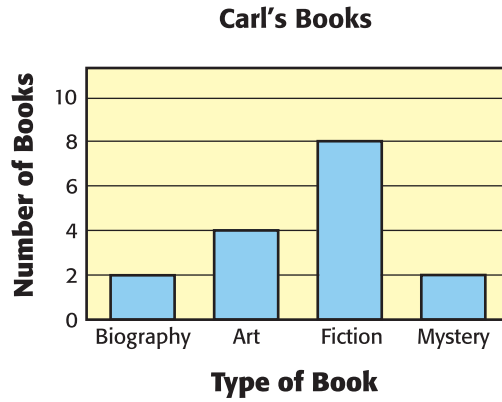
B



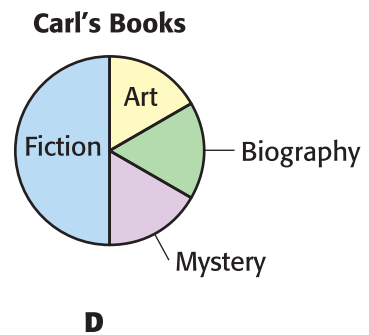
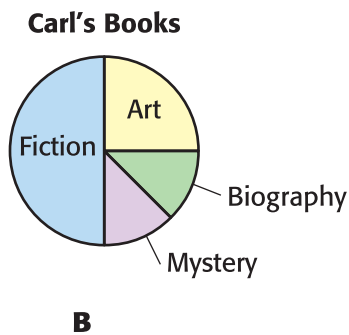
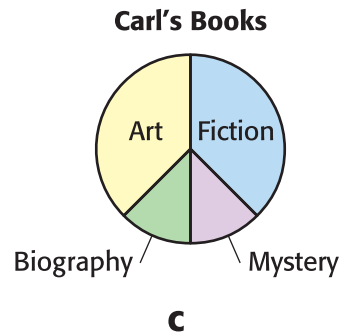
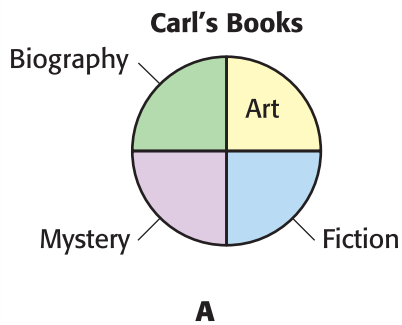
D

36

Carl has 16 books in his bookcase. This bar graph shows the number of each type of book.



Which circle graph best shows the types of books Carl has in his bookcase?





37

Greg took five tests each worth 100 points.

He earned the following scores:

85, 87, 87, 89, 97

What is Greg's mean (average) score for these five tests?

- 89 88 87 12
A **B** **C** **D**

38

This table represents the first eight U.S. Presidents and their years in office.

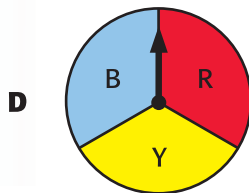
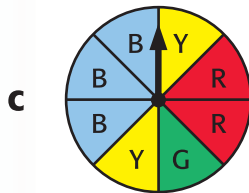
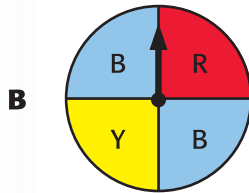
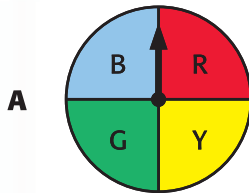
U.S. President	Years in Office
G. Washington	8
J. Adams	4
T. Jefferson	8
J. Madison	8
J. Monroe	8
J.Q. Adams	4
A. Jackson	8
M. Van Buren	4

What are the median and range for the number of years in office for these eight U.S. Presidents?

- A** Median = 4, Range = 4
B Median = 4, Range = 8
C Median = 8, Range = 4
D Median = 8, Range = 8

39

Which spinner has the greatest probability of the arrow landing on a section labeled B?



40

Ms. Simmons has a set of 10 tiles numbered from 0 to 9 in a bag. The tiles are the same size and shape.

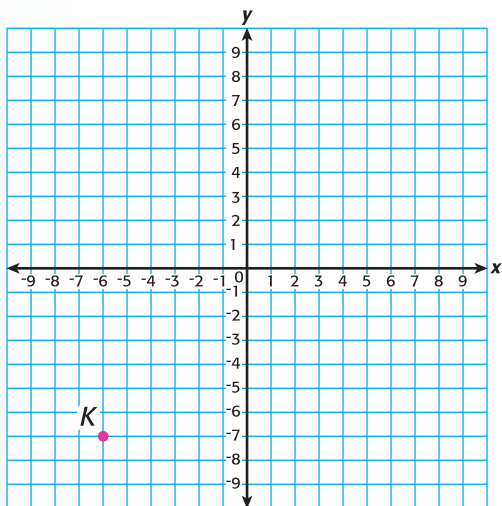
What is the probability that the first tile Ms. Simmons randomly chooses will have an odd number on it?

- A** $\frac{4}{9}$
- B** $\frac{5}{9}$
- C** $\frac{2}{5}$
- D** $\frac{1}{2}$



41

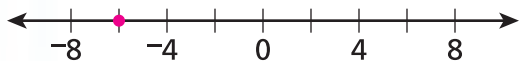
What ordered pair describes the location of point *K* on this coordinate grid?



- A (-6, -7)
- B (-6, 7)
- C (6, -7)
- D (6, 7)

42

What is the *absolute value* of the point graphed on this number line?



- A -7
- B -6
- C 6
- D 7

43

What is a coefficient in this expression?

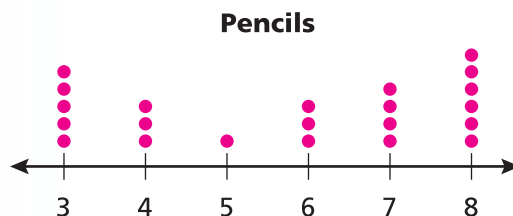
$$8 + 6c \cdot 4$$

- A 8
- B 6
- C *c*
- D 4

44

Charles conducts a survey of the number of pencils his classmates have.

This dot plot shows the results of his survey.



Based on the results, what is the median of the data?

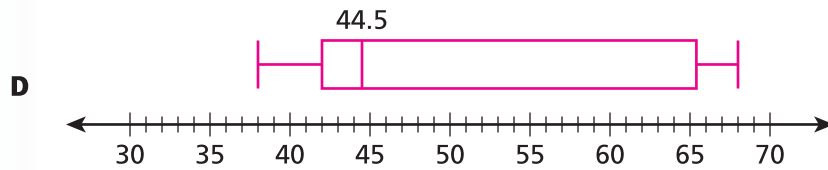
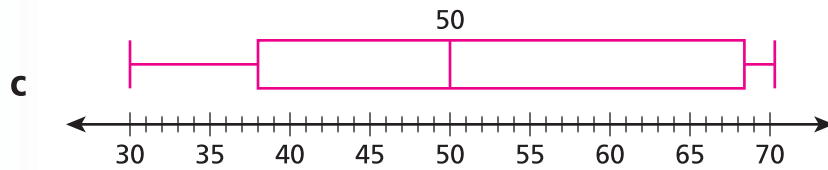
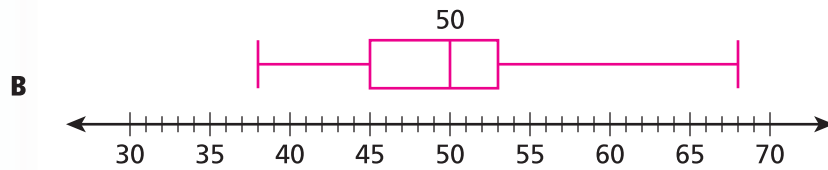
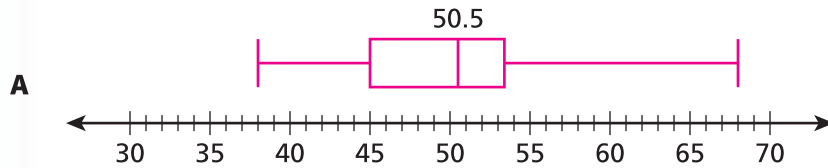
- A 3
- B 5
- C 6
- D 8

45

A police officer lists the speeds in miles per hour of 12 cars.

42, 50, 45, 50, 54, 38, 51, 46, 68, 45, 52, 65

Which box-and-whisker plot shows this data?



Answer Key with Assessment Objectives Identified

Item Number	Correct Answer	Assessment Objective
1	C	6.6.01 Read, write, recognize, and model equivalent representations of whole numbers and their place values.
2	B	6.6.05 Read, write, recognize, and model equivalent representations of decimals and their place values through thousandths.
3	C	6.6.06 Represent repeated factors using exponents.
4	B	6.6.13 Solve problems and number sentences involving addition, subtraction, and multiplication of decimals.
5	D	6.6.14 Solve problems involving addition and subtraction of fractions and mixed numbers, and express answers in simplest form.
6	B	6.6.15 Identify and apply order of operations to simplify numeric expressions involving whole numbers.
7	A	6.6.16 Solve problems involving the commutative, distributive, and associative properties of operations on whole numbers [e.g., $(5 \times 7) \times 2 = 5 \times (7 \times 2)$].
8	A	6.6.18 Identify and express ratios using appropriate notation (i.e., a/b , a to b , $a:b$), identify equivalent ratios, and explain ratios that represent a given situation.
9	B	6.6.21 Solve number sentences and problems involving percents.
10	C	7.6.01 Select and use appropriate standard units and tools to measure length, mass/weight, capacity, and angles.
11	D	7.6.02 Solve problems involving the perimeter and area of a triangle, parallelogram, or irregular shape using diagrams, models, and grids or by measuring or using given formulas (may include sketching a figure from its description).
12	D	7.6.03 Compare and estimate length (including perimeter), area, volume, weight/mass, and angles (0° to 180°) using referents.
13	C	7.6.05 Solve problems involving unit conversions within the same measurement system for time, length, and weight/mass, including compound units (e.g., 5ft, 5in, 2lbs 2oz).
14	C	7.6.06 Solve problems involving scale drawings and maps.
15	A	8.6.02 Write an expression using variables to represent unknown quantities.
16	B	8.6.03 Evaluate algebraic expressions with up to two whole number variable values (e.g., evaluate $3m + n + 3$ when $m = 4$ and $n = 2$).
17	D	8.6.04 Determine a rule having two operations from an input–output table (e.g., multiply by 3 and add 2).
18	C	8.6.05 Select a table of values that satisfies a linear equation, and recognize the ordered pairs on a rectangular coordinate system.

Item Number	Correct Answer	Assessment Objective
19	C	8.6.05 Select a table of values that satisfies a linear equation, and recognize the ordered pairs on a rectangular coordinate system.
20	C	8.6.07 Identify graphs of inequalities on a number line.
21	C	8.6.07 Identify graphs of inequalities on a number line.
22	B	8.6.08 Represent problems with equations and inequalities.
23	B	8.6.09 Solve for the unknown in an equation with one operation (e.g., $8x = 24$, $m \div 2 = 25$).
24	C	9.6.03 Solve problems using properties of triangles and quadrilaterals (e.g., sum of interior angles of a quadrilateral is 360°).
25	B	9.6.05 Graph, locate, identify points, describe paths, and plot figures using ordered pairs (first quadrant).
26	B	9.6.06 Identify, describe, and predict results of reflections, translations, and rotations of two-dimensional shapes.
27	C	9.6.07 Identify and sketch parallel, perpendicular, and intersecting lines.
28	D	9.6.07 Identify and sketch parallel, perpendicular, and intersecting lines.
29	D	9.6.09 Identify a three-dimensional object from its net.
30	A	9.6.11 Identify congruent and similar figures by visual inspection.
31	D	9.6.12 Determine if figures are similar, and identify relationships between corresponding parts of similar figures.
32	B	9.6.12 Determine if figures are similar, and identify relationships between corresponding parts of similar figures.
33	D	10.6.01 Read, interpret, and make predictions from data represented in a bar graph, line (dot) plot, Venn diagram (with two circles), chart/table, line graph, or circle graph.
34	C	10.6.01 Read, interpret, and make predictions from data represented in a bar graph, line (dot) plot, Venn diagram (with two circles), chart/table, line graph, or circle graph.
35	D	10.6.01 Read, interpret, and make predictions from data represented in a bar graph, line (dot) plot, Venn diagram (with two circles), chart/table, line graph, or circle graph.
36	B	10.6.02 Compare different representations of the same data.
37	A	10.6.04 Determine the mode, range, median, and mean, given a set of data or a graph.

Item Number	Correct Answer	Assessment Objective
38	C	10.6.04 Determine the mode, range, median, and mean, given a set of data or a graph.
39	B	10.6.05 Solve problems involving the probability of a simple event, including representing the probability as a fraction, decimal, or percent.
40	D	10.6.05 Solve problems involving the probability of a simple event, including representing the probability as a fraction, decimal, or percent.
41	A	6.NS.6c Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
42	C	6.NS.7c Understand ordering and absolute value of rational numbers. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. <i>For example, for an account balance of -30 dollars, write $-30 = 30$ to describe the size of the debt in dollars.</i>
43	B	6.EE.2b Write, read, and evaluate expressions in which letters stand for numbers. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. <i>For example, describe the expression $2(8 + 7)$ as a product of two factors; view $(8 + 7)$ as both a single entity and a sum of two terms.</i>
44	C	6.SP.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
45	B	6.SP.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

To view all the mathematics assessment objectives, download the *Illinois Mathematics Assessment Framework* for Grades 3–8 online at www.isbe.net/assessment/IAFindex.htm and the *Common Core Standards* at http://www.isbe.net/common_core/default.htm.

**Mathematics Short-Response
Scoring Rubric
Followed by Student Samples**

Mathematics Short-Response Scoring Rubric

The following rubric is used to score the short-response items for all grade levels.

SCORE LEVEL	DESCRIPTION
2	Completely correct response, including correct work shown and/or correct labels/units if called for in the item
1	Partially correct response
0	No response, or the response is incorrect

Using Short-Response Samples

Beginning with the spring 2008 ISAT, the sample short-response question and answer (shown below) that appeared in the 2006 and 2007 ISAT test directions will no longer be included in the directions immediately prior to session 2. ISBE encourages educators to practice these types of items with students during the course of the school year so they are familiar with them prior to ISAT testing.

SAMPLE SHORT-RESPONSE QUESTION

Sam can buy his lunch at school. Each day, he wants to buy juice that costs 50¢, a sandwich that costs 90¢, and fruit that costs 35¢.

Exactly how much money does Sam need to buy lunch for 5 days?

Show your work and label your answer.

SAMPLE SHORT-RESPONSE ANSWER

Handwritten student work on grid paper:

$50¢ + 90¢ + 35¢ = \$1.75$
 for each day

My answer
 \$8.75

$$\begin{array}{r}
 ^3 ^2 \\
 1.75 \\
 1.75 \\
 1.75 \\
 1.75 \\
 + 1.75 \\
 \hline
 \$8.75 \text{ for five days}
 \end{array}$$

Please refer to the 2008 through 2011 ISAT sample books for additional short-response items and student samples (online at www.isbe.net/assessment/htmls/sample_books.htm).

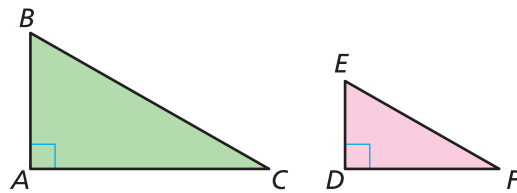
Mathematics Short-Response Sample Item 1

Below is a short-response sample item, followed by 3 samples of student responses.

This short-response sample item is classified to assessment objective 9.6.12, “Determine if figures are similar, and identify relationships between corresponding parts of similar figures.”

1

$\triangle ABC$ is similar to $\triangle DEF$.



1. Name one pair of corresponding angles.

2. Name one pair of corresponding sides.

Be sure to use appropriate labeling.

Short Response Student Sample 1A

1 pair of corresponding angles =
 $\angle A$ and $\angle D$

1 pair of corresponding sides =
side BA and side ED

Short-Response Student Sample 1A

Rubric Score Point = 2

Note: In this completely correct response the student names a correct pair of corresponding angles ($\angle A$ and $\angle D$) and a correct pair of corresponding sides (side BA and side ED).

Short Response Student Sample 1B

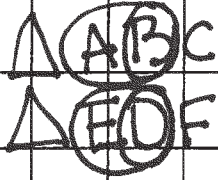
1. $\angle B$ corresponds with $\angle E$
2. \overline{AB} corresponds with \overline{ED} .

Short-Response Student Sample 1B

Rubric Score Point = 2

Note: In this completely correct response the student provides a correct pair of corresponding angles ($\angle B$ corresponds with $\angle E$) and a correct pair of corresponding sides (AB corresponds with ED).

Short Response Student Sample 1C



1. \overline{AB} , \overline{ED}

2. B , D

Short-Response Student Sample 1C

Rubric Score Point = 1

Note: In this partially correct response the student names a correct pair of corresponding sides (1. AB , ED), but incorrectly names a pair of corresponding angles (2. B , D). The student attempts to number the answers, but the use of one, two or three letters is used to make the identification of what pair the student is referencing. Note: Sides must be identified using 2 letters and angles must be identified using 1 or 3 letters.

Mathematics Short-Response Sample Item 2

Below is a short-response sample item, followed by 3 samples of student responses.

This short-response sample item is classified to assessment objective 8.6.04, “Determine a rule having two operations from an input–output table (e.g., multiply by 3 and add 2).”

2

An input-output table is shown below.

Input	Output
1	4
2	7
3	10
4	13
5	16
6	?
10	?

1. What is the output when the input is 6?
2. What is the output when the input is 10?

Show your work.

Short Response Student Sample 2A

$$1 \times 3 + 1 = 4$$

$$2 \times 3 + 1 = 7$$

$$3 \times 3 + 1 = 10$$

$$6 \times 3 + 1 = \boxed{19}$$

Answer
to #1

$$10 \times 3 + 1 = \boxed{31}$$

Answer
to #2

Short-Response Student Sample 2A

Rubric Score Point = 2

Note: In this completely correct response the student provides correct outputs (19 and 31) with work that shows use of the pattern, $(input \times 3) + 1$ ($6 \times 3 + 1 = 19$ and $10 \times 3 + 1 = 31$).

Short Response Student Sample 2B

Input	Output
1	+3 4
2	+5 7
3	+7 10
6	? +13 <u>6</u> 19

5 | 16 + 11

1. Output is 19 when the input is 6

2. The output is 31 when the input is 10

7 + 15
8 + 17
9 + 19
10 + 21 = 31

10 | ? = 31

Short-Response Student Sample 2B

Rubric Score Point = 2

Note: In this completely correct response the student provides correct outputs (19 and 31) with work that shows understanding of the pattern (6 + 13 = 19; 10 + 21 = 31 and +3, +5, +7) on the input-output table as well as finding the increase for 7, 8, and 9. The student recognizes that the amount added to the input increases by two each time the input goes up by one.

Short Response Student Sample 2C

① $16 + 3 = 19$ 6 input \rightarrow 19 output

② $19 + 3 = 22$ 10 input \rightarrow 22 output

③ therefore the answers are

6 input \rightarrow 19 output

10 input \rightarrow 22 output

Short-Response Student Sample 2C

Rubric Score Point = 1

Note: In this partially correct response the student provides one correct output (19) for the input of 6. The student recognizes that the rule on the output side of the table is +3, but applies this directly to the output of 19 to find the input for 10 without accounting for the additional inputs of 7, 8, and 9.

**Mathematics Extended-Response
Scoring Rubric
Followed by Student Samples**

Mathematics Extended-Response Scoring Rubric

The following rubric is used to score the extended-response items for all grade levels. A student-friendly version of this extended-response scoring rubric is available online at www.isbe.net/assessment/math.htm.

SCORE LEVEL	MATHEMATICAL KNOWLEDGE:	STRATEGIC KNOWLEDGE:	EXPLANATION:
	Knowledge of mathematical principles and concepts which result in a correct solution to a problem.	Identification and use of important elements of the problem that represent and integrate concepts which yield the solution (e.g., models, diagrams, symbols, algorithms).	Written explanation of the rationales and steps of the solution process. A justification of each step is provided. Though important, the length of the response, grammar, and syntax are not the critical elements of this dimension.
4	<ul style="list-style-type: none"> shows complete understanding of the problem's mathematical concepts and principles uses appropriate mathematical terminology and notations including labeling answer if appropriate executes algorithms and computations completely and correctly 	<ul style="list-style-type: none"> identifies all important elements of the problem and shows complete understanding of the relationships among elements shows complete evidence of an appropriate strategy that would correctly solve the problem 	<ul style="list-style-type: none"> gives a complete written explanation of the solution process; clearly explains <u>what</u> was done and <u>why</u> it was done may include a diagram with a complete explanation of all its elements
3	<ul style="list-style-type: none"> shows nearly complete understanding of the problem's mathematical concepts and principles uses mostly correct mathematical terminology and notations executes algorithms completely; computations are generally correct but may contain minor errors 	<ul style="list-style-type: none"> identifies most of the important elements of the problem and shows a general understanding of the relationships among them shows nearly complete evidence of an appropriate strategy for solving the problem 	<ul style="list-style-type: none"> gives a nearly complete written explanation of the solution process; clearly explains <u>what</u> was done and begins to address <u>why</u> it was done may include a diagram with most of its elements explained
2	<ul style="list-style-type: none"> shows some understanding of the problem's mathematical concepts and principles uses some correct mathematical terminology and notations may contain major algorithmic or computational errors 	<ul style="list-style-type: none"> identifies some important elements of the problem but shows only limited understanding of the relationships among them shows some evidence of a strategy for solving the problem 	<ul style="list-style-type: none"> gives some written explanation of the solution process; either explains <u>what</u> was done or addresses <u>why</u> it was done explanation is vague, difficult to interpret, or does not completely match the solution process may include a diagram with some of its elements explained
1	<ul style="list-style-type: none"> shows limited to no understanding of the problem's mathematical concepts and principles may misuse or fail to use mathematical terminology and notations attempts an answer 	<ul style="list-style-type: none"> fails to identify important elements or places too much emphasis on unrelated elements reflects an inappropriate strategy for solving the problem; strategy may be difficult to identify 	<ul style="list-style-type: none"> gives minimal written explanation of the solution process; may fail to explain <u>what</u> was done and <u>why</u> it was done explanation does not match presented solution process may include minimal discussion of the elements in a diagram; explanation of significant elements is unclear
0	<ul style="list-style-type: none"> no answer attempted 	<ul style="list-style-type: none"> no apparent strategy 	<ul style="list-style-type: none"> no written explanation of the solution process is provided

Using Extended-Response Samples

Beginning with the spring 2008 ISAT, the sample extended-response problem and solution (shown below) that appeared in the 2006 and 2007 ISAT test directions will no longer be included in the directions immediately prior to session 3. ISBE encourages educators to practice these types of items with students during the course of the school year so they are familiar with them prior to ISAT testing.

SAMPLE EXTENDED-RESPONSE PROBLEM

Mrs. Martin wants to put tiles on the floor by the front door of her house. She wants to use 3 different colors of tiles in her design.

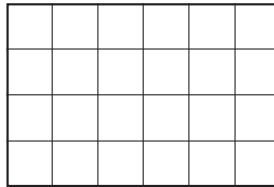
She also wants

$\frac{1}{2}$ of the tiles to be blue,

$\frac{1}{4}$ of the tiles to be gray, and

$\frac{1}{4}$ of the tiles to be red.

Use the grid below to design a floor for Mrs. Martin. Label each tile with the first letter of the color that should be placed there.



Show all your work. Explain in words how you found your answer. Tell why you took the steps you did to solve the problem.

SAMPLE EXTENDED-RESPONSE SOLUTION

B	B	B	B	B	B	} $\frac{1}{2}$ blue
B	B	B	B	B	B	
G	G	G	G	G	G	← $\frac{1}{4}$ gray
R	R	R	R	R	R	← $\frac{1}{4}$ red

First, I know that there are 4 equal rows, so 2 rows is half and 1 row is $\frac{1}{4}$. So I made 2 rows B for blue because she wants half the tiles blue. Then I made 1 row G for gray because she wants $\frac{1}{4}$ of the tiles to be gray. Since she wants gray and red to be the same amount of tiles, I made the last row R for red.

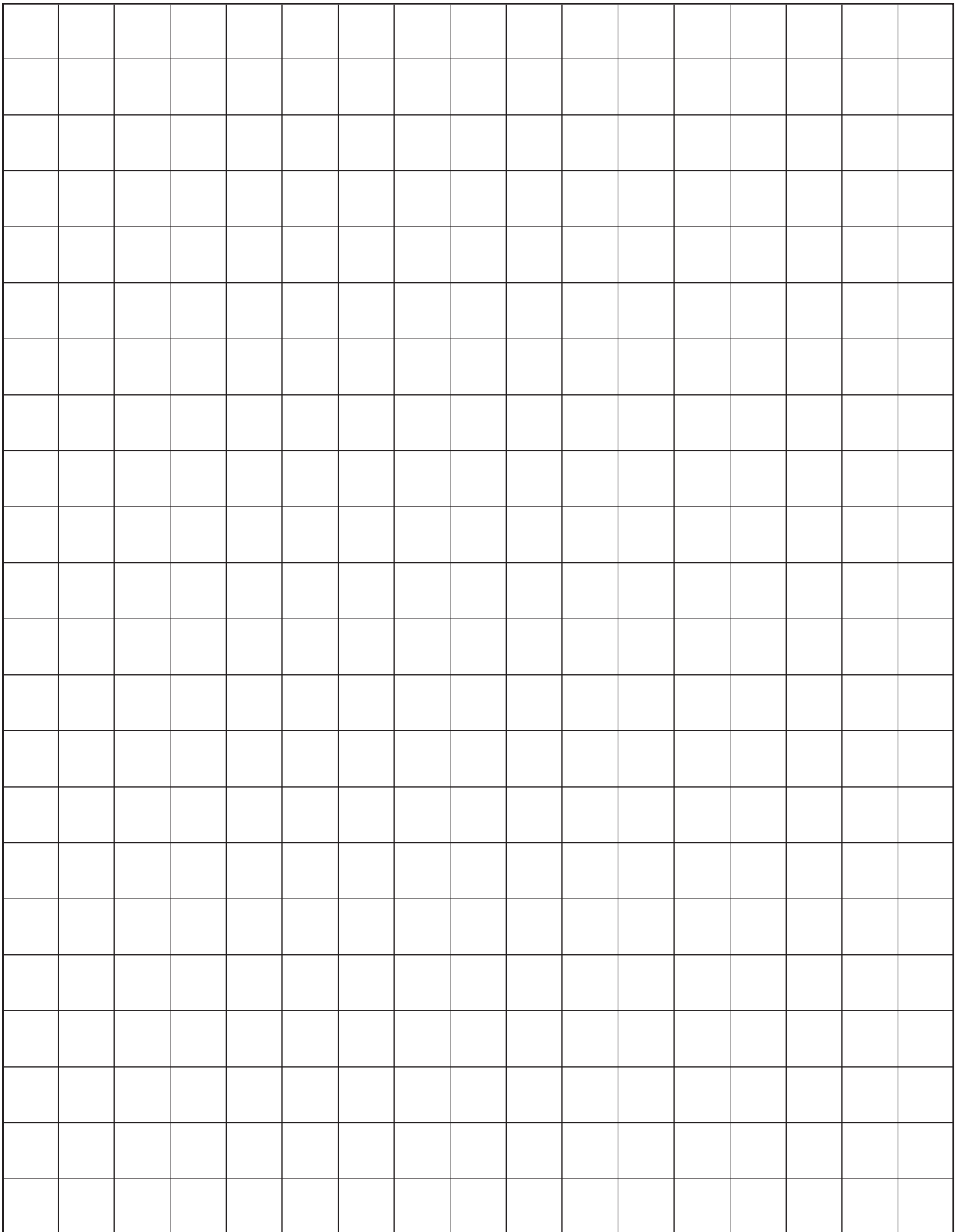
Please refer to the 2008 through 2011 ISAT sample books for additional extended-response items and student samples (online at www.isbe.net/assessment/htmls/sample_books.htm).

Blank Extended-Response Template**Mathematics - Session 3****Problem 1****DIRECTIONS****Make sure you:**

- show all your work in solving the problem,
- clearly label your answer,
- write in words what you did to solve the problem,
- write in words why you took the steps you did to solve the problem, and
- write as clearly as you can.

Mathematics - Session 3

Problem 1 (continued)



Mathematics Extended-Response Sample Item 1

Below is an extended-response sample item, followed by 3 student samples.

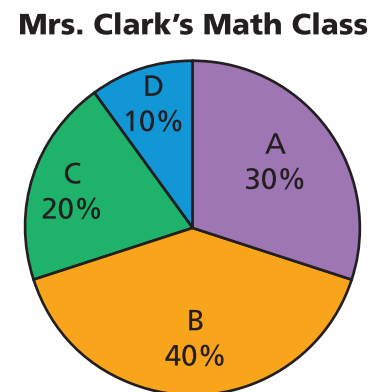
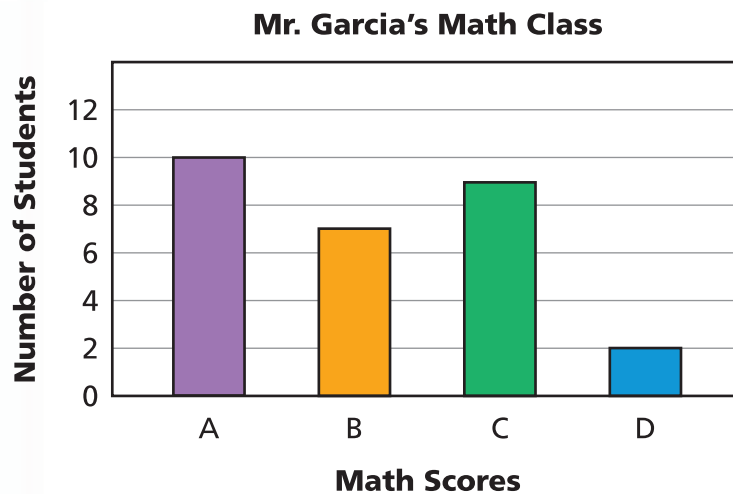
This extended-response sample item is classified to assessment objective 10.6.01, “Read, interpret, and make predictions from data represented in a bar graph, line (dot) plot, Venn diagram (with two circles), chart/table, line graph, or circle graph.”

1

East Prairie Middle School has two sixth-grade math classes.

- Mr. Garcia has 28 students in his math class.
- Mrs. Clark has 30 students in her math class.

The graphs show the math scores in each class.



What is the total number of sixth-grade students that received a “B” in math?

Show all your work. Explain in words how you found your answer. Write why you took the steps you did to solve the problem.

Extended-Response Student Sample 1A

DIRECTIONS

Make sure you:

- show all your work in solving the problem,
- clearly label your answer,
- write in words what you did to solve the problem,
- write in words why you took the steps you did to solve the problem, and
- write as clearly as you can.

To figure out this problem I read the question more than once.

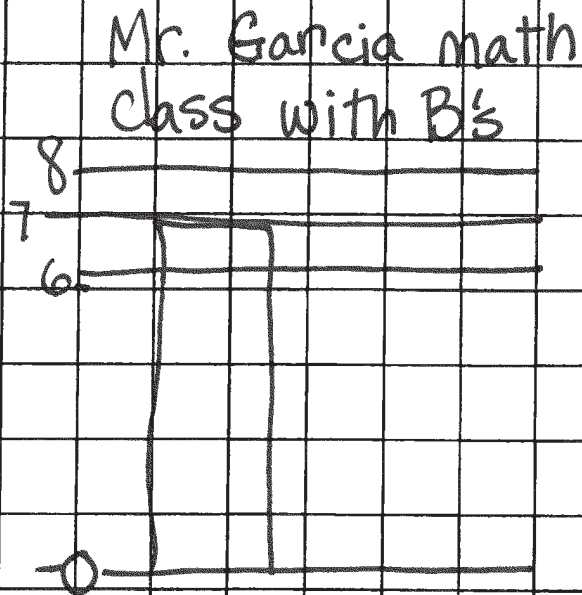
First I looked at the bar graph. and in Mr. Garcia's class there were 7 people with B's because the bar was between the 8 and the 6. Then in Mrs. Clark's class 40% ~~of~~ 30 students had a B so I used my calculator

$40\% \text{ of } 30 = 12$. Last I add the

7 people with B's in Mr. Garcia's class and the 12 in Mrs. Clark's class

$12 + 7 = 19$ students with B's.

Extended-Response Student Sample 1A Continued



Mrs. Clark's math class with B's

40% of 30 = 12

I used the calculator

$$7 + 12 = 19 \text{ people with B's.}$$

Extended-Response Student Sample 1B

DIRECTIONS

Make sure you:

- show all your work in solving the problem,
- clearly label your answer,
- write in words what you did to solve the problem,
- write in words why you took the steps you did to solve the problem, and
- write as clearly as you can.

① Mr. Garcia's class
(math)
↓
7 B students

② Mrs. Clark's Class (math)
↓
40% → $\frac{2}{5}$

③ $5 \overline{)30}^6$ ④ $6 \times 2 = 18$

⑤ $\begin{array}{r} 18 \\ + 7 \\ \hline \end{array}$
25 students received a
B in math
↑
answer

I know that Mr. Garcia has 28 students in his math class and Mrs. Clark has 30 students. Also, I know 7 students have a B in Mr. Garcia's class and 40% of the 30 students in Mrs. Clark's class have a B. I need to know how many students got a B in math in all.

Extended-Response Student Sample 1B Continued

What I did	Why I did it
① I found out that 7 students got a B in Mr. Garcia's math class.	① I did this, because I had to find out how many students got a B in all.
② I changed 40% into $\frac{2}{5}$.	② I did this, because I had to divide and I can't divide with a percent.
③ I divided 30 by 5 and it equalled 6.	③ I did this because the fraction I got before had a denominator of 5 so I divided it by 5.
④ I multiplied 6 and 2 and the product was 12.	④ I did this, because the fraction I got before was two fifths so I had to multiply my product by 2.
⑤ I added 12 and 7. I got 19 students received a B in math as my answer.	⑤ I did this, because I got 7 students from Mr. Garcia's class that got a B and 12 students from Mrs. Clark's math class that got a B and together there is 19 students with a B.

Extended-Response Student Sample 1C

DIRECTIONS

Make sure you:

- show all your work in solving the problem,
- clearly label your answer,
- write in words what you did to solve the problem,
- write in words why you took the steps you did to solve the problem, and
- write as clearly as you can.

work

$$\textcircled{1.} \quad 30^{\text{students}} \cdot 40\% = \textcircled{12 \text{ students}}$$

$$\textcircled{2.} \quad 12 \text{ students} \div 40\% = \textcircled{30 \text{ students}}$$

A total of 12 students
got a B in math.

Extended-Response Student Sample 1C Continued

What I Did...	Why I Did It...
<p>① First I multiplied 30, by 40% and got 12 students</p>	<p>① I did this because In the question it wanted to know how many students got a B. And it said 40% got a B and there were 30 students in Mrs. Clark's math class.</p>
<p>② Lastly I divided 12 students by 40% and got 30.</p>	<p>② I did this because to make sure you have the right answer you check it. And multiplication and division can be used to check one another I did that to get the answer. My final answer was that 12 students got a B in Mrs. Clark's math class.</p>

Scoring Guide for “Students Receiving a B in Math”

To solve this problem, students are asked to determine the number of students that received a B in Mr. Garcia’s class.

Extended-Response Student Sample 1A

MATHEMATICAL KNOWLEDGE	STRATEGIC KNOWLEDGE	EXPLANATION
4	4	4
<p>The response shows complete understanding of the problem’s mathematical concepts and principles. The student provides a correct mathematical answer (19) with completely correct computations ($40\% * 30 = 12$, $12 + 7 = 19$).</p>	<p>The student provides evidence for all four important elements of the problem and shows complete understanding of the relationships among elements. Complete evidence of an appropriate strategy that would correctly solve the problem is provided by determining the number of students that received a B in Mr. Garcia’s class by reading the bar graph (7 people with B’s because the bar was between the 8 and the 6), appropriately using 40% by setting up an equation ($40\% * 30$), appropriately finding for the number of students that received a B in Mrs. Clark’s class with an equation that uses the correct total number of students in Clarks class ($\dots * 30$), and by determining the total number of students that received a B in both classes by adding ($12 + 7 = 19$ students with B’s).</p>	<p>The response gives a nearly complete written explanation of the solution process that explains what was done (<i>looked at the bar graph . . . there were 7 people with B’s . . . 40% of $30 = 12$. . . add the 7 people with B’s in Mr. Garcia’s class and the 12 in Mrs. Clark’s class</i>) and explains why the number 7 was found (<i>because the bar was between the 8 and the 6</i>), why 40% was multiplied by 30 (<i>in Mrs. Clarks class 40% of 30 students had a B</i>), and why the class totals are added (<i>I added . . . Mr. Garcia’s class and . . . Mrs. Clark’s class . . . 19 students with B’s</i>) is implied.</p>

Extended-Response Student Sample 1B

MATHEMATICAL KNOWLEDGE	STRATEGIC KNOWLEDGE	EXPLANATION
3	4	4
<p>The response shows nearly complete understanding of the problem's mathematical concepts and principles. The student computations contain a minor computational error ($6 \times 2 = 18$) that leads to an incorrect answer ($40\% \rightarrow 2/5, 5/30 = 6, 6 \times 2 = 18, 18 + 7 = 25$).</p>	<p>The student provides evidence for all four important elements of the problem and shows complete understanding of the relationships among elements. Complete evidence of an appropriate strategy that would correctly solve the problem is provided by determining the number of students that received a B in Mr. Garcia's class by reading the bar graph (7 B students), appropriately using 40% by setting up an equation ($40\% \rightarrow 2/5 \dots 30 \div 5 = 6, 6 \times 2$), appropriately finding for the number of students that received a B in Mrs. Clark's class with a proportion using the correct total number of students in Clarks class ($30 \div 5 = 6, 6 \times 2$), and by determining the total number of students that received a B in both classes by adding ($18 + 7 = 25$).</p>	<p>The response gives a complete written explanation of the solution process. The student clearly explains what was done in the solution process and why it was done (<i>I found out that 7 students got a B in Mr. Garcia's math class ... because I had to find out how many students got a B in all ... I changed 40% into 2/5 ... because I had to divide and I can't divide with a percent ... I divided 30 by 5 and it equaled 6 ... because the fraction I got before had a denominator of 5 so I divided it by 5 ... I multiplied 6 and 2 and the product was 18 ... because the fraction I got before was two fifths so I had to multiply my product by 2 ... I added 18 and 7. I got 25 ... because I got 7 students from Mr. Garcia's class that got a B and 18 students from Mrs. Clark's</i>). The explanation clearly correlates to the chosen strategy.</p>

Extended-Response Student Sample 1C

MATHEMATICAL KNOWLEDGE	STRATEGIC KNOWLEDGE	EXPLANATION
2	2	4
<p>The response shows some understanding of the problem's mathematical concepts and principles. The response correctly computes 12 students receiving a B in Mrs. Clark's class ($30 \text{ students} \cdot 40\% = 12 \text{ students}$) but no number is given for students receiving a B in Mr. Garcia's class and no correct total is given for students receiving a B in all of 6th grade. Additional work is done to show using the inverse to check the answer ($12 \text{ students} / 40\% = 30 \text{ students}$), but no incorrect computations are shown.</p>	<p>This response identifies two important elements of the problem, but shows only limited understanding of the relationships among elements. Some evidence of an appropriate strategy that would correctly solve the problem is provided by appropriately using 40% ($30 \text{ students} \times 40\% = 12 \text{ students}$) and appropriately finding for the number of students that received a B in Mrs. Clark's class using the correct total number of students in Clarks class ($30 \text{ students} \times 40\% = 12 \text{ students}$). There is no evidence of determining the number of students that received a B in Mr. Garcia's class or determining the total number of students that received a B in both classes.</p>	<p>The response gives a complete written explanation of the solution process. The student clearly explains what was done in the solution process and why it was done (<i>multiplied 30 students by 40% and got 12 students . . . In the question it wanted to know how many students got a B. And it said 40% got a B and there were 30 students in Mrs. Clark's math class . . . I divided 12 students by 40% and got 30 . . . to make sure you have the right answer you check it. And multiplication and division can be used to check one another</i>). The student clearly explains each step of the solution process shown in the response.</p>