



**Arkansas Comprehensive Testing, Assessment and Accountability Program**

# **Released Item Booklet**

**Benchmark Examination  
Middle Level (Grade 8)**

**April 2003 Administration**

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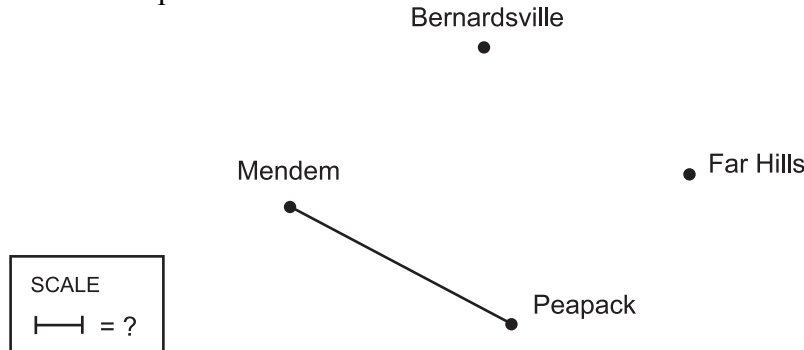
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**Arkansas Department of Education**

**PART II Released Items (Mathematics)**

**CALCULATOR NOT PERMITTED — ITEMS 1 – 8**

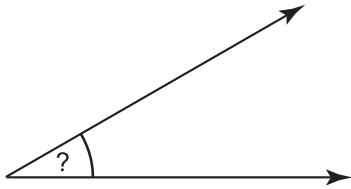
1. Ian knows that the distance from Mendem to Peapack is 15 miles. What is the **best** estimate for the distance on the scale on the map?



- A.  $\text{—} = 15$  miles
- B.  $\text{—} = 5$  miles
- \* C.  $\text{—} = 3$  miles
- D.  $\text{—} = 1$  mile
- 
2. Laurie used a survey as the basis of a term paper about student opinion on fast food. Which of the following techniques would have given Laurie the **best** sample?
- A. Interview the 25 students in her homeroom class.
- B. Interview 25 students at a high school sporting event.
- C. Interview the first 25 students entering a local fast food restaurant.
- \* D. Interview 25 students randomly selected from the high school directory.
3. Brooke knows the formula  $d = rt$  where  $d$  is distance,  $r$  is speed and  $t$  is time. Brooke knows her distance and time and wants to calculate her speed. Which of the following formulas shows speed as a function of time and distance?
- A.  $r = dt$
- \* B.  $r = \frac{d}{t}$
- C.  $r = \frac{t}{d}$
- D.  $r = d - t$

**PART II Released Items (Mathematics)**

4. Which of the following is closest to the measure of the angle below?

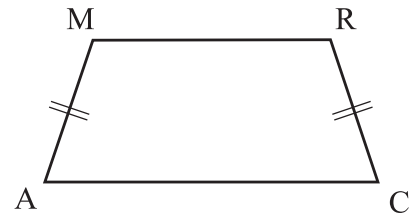


- \* A.  $30^\circ$
  - B.  $60^\circ$
  - C.  $90^\circ$
  - D.  $120^\circ$
5. How many faces does a square pyramid have?
- A. 3
  - B. 4
  - \* C. 5
  - D. 6
6. Olivia wanted to construct a statistical graph to show the percentage of funds earned by each of the classes in an annual candy sale fundraiser. Which of the following graphs will **best** show this information?
- \* A. a circle graph
  - B. a line graph
  - C. a scatter plot
  - D. a stem-and-leaf plot

7. All of the following values represent the distance from the sun to Neptune. Which is correctly stated in scientific notation?

- A.  $0.28 \times 10^{10}$  miles
- \* B.  $2.8 \times 10^9$  miles
- C.  $2800 \times 10^6$  miles
- D. 2,800,000,000 miles

8. Which of the following terms **best** describes quadrilateral AMRC?



- A. kite
- B. rectangle
- C. rhombus
- \* D. trapezoid

**PART II Released Items (Mathematics)**

**CALCULATOR PERMITTED — ITEMS 9 – 40**

9. Using the following number pattern

1, 7, 49, 343 . . .

what is the 8th number in the sequence?

- A. 117,649
  - B. 822,763
  - \* C. 823,543
  - D. 5,764,801
10. Manuel's father wants to add 3 inches of asphalt to his driveway to make it 3 inches thicker. If his driveway is 48 feet long and 18 feet wide, how many **cubic yards** of asphalt will he need?
- \* A. 8
  - B. 96
  - C. 288
  - D. 2,592
11. The manager of the local farm supply store ordered chicks this spring. He orders the chicks in sets of 6. He sold 21 different customers 2 chicks apiece; he sold out his order. How many sets of 6 chicks did he order?
- A. 6
  - \* B. 7
  - C. 21
  - D. 42

12. Jamal's school is going to do a drawing competition to determine which student will represent the school at a city-wide rally organized to clean up the city parks. Each student has an equal chance of being selected. There are 500 students in the school. What is the probability that any one of the 29 students in Jamal's class will be selected to represent his school?
- A. 1%
  - \* B. 6%
  - C. 10%
  - D. 28%
13. Which one of the following figures has the fewest number of parallel sides?
- A. rhombus
  - \* B. trapezoid
  - C. rectangle
  - D. square
14. Werner finishes his walk at 5:00 p.m. If he has been walking for 2 hours and 33 minutes, when did he start?
- \* A. 2:27 p.m.
  - B. 2:33 p.m.
  - C. 3:27 p.m.
  - D. 4:33 p.m.

## PART II Released Items (Mathematics)

15. As Joe left school on Thursday, he was told that there would be a 50% chance that school will be closed on Friday due to a severe weather forecast. Which one of the following statements **best** represents this situation?

A. It is likely that school will open for only half of the day on Friday.

B. The school will probably be closed on Friday.

C. The school will probably be open on Friday.

\* D. It is equally likely that school will be open or closed on Friday.

16. A light-year equals about six trillion miles. How would you write this in scientific notation?

A.  $6 \times 1,000,000,000,000$

B.  $6 \times 10^{10}$

\* C.  $6 \times 10^{12}$

D.  $6 \times 10^{14}$

17. If the cost of a banana, an apple, and an orange is  $x¢$ ,  $y¢$ , and  $z¢$ , respectively, what does the equation  $3x + 2y = 4z$  mean?

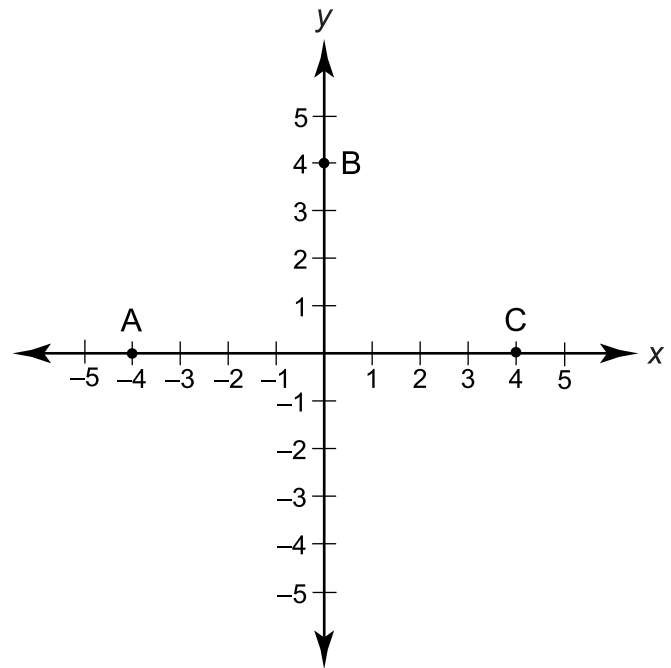
\* A. The cost of 3 bananas and 2 apples is the same as that of 4 oranges.

B. The cost of 3 bananas and 2 oranges is the same as that of 4 apples.

C. The cost of 3 apples and 2 oranges is the same as that of 4 bananas.

D. The cost of 3 apples and 2 bananas is the same as that of 6 oranges.

18. Max is plotting a square in the coordinate system shown below.



Three of its vertices are designated as A, B, and C. Which of the following would represent the coordinates of the 4th vertex of the square?

A. (0, 4)

\* B. (0, -4)

C. (4, 0)

D. (2, 2)

19. Peter bought 2 identical shirts and 1 jacket for a total of \$75. The next day he bought 5 more shirts (identical to the first 2), also for a total of \$75. How much did the jacket cost?

A. \$30

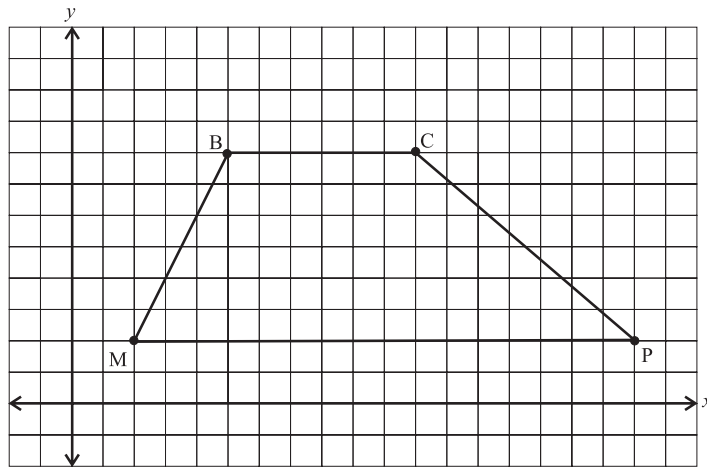
B. \$35


C. \$40

\* D. \$45

## PART II Released Items (Mathematics)

20. What is the area of the quadrilateral MBCP?



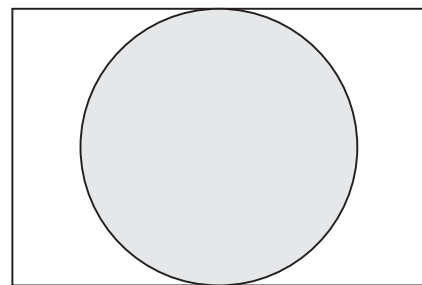
 = 1 square unit

- A. 72 square units
- \* B. 66 square units
- C. 57 square units
- D. 36 square units

21. Malcolm and his cousin James wanted to buy a new music CD. They checked prices at five different stores. The first store they visited had the CD priced at \$13.00, the second store at \$13.50, the third store at \$13.99, the fourth store at \$14.99, and the fifth store had the CD priced at \$7.00. What was the median price of the CD?

- A. \$7.00
- B. \$12.50
- \* C. \$13.50
- D. \$14.99

Use the diagram below to answer question 22.



22. The area of the rectangle shown above is 24 square units. Which of the following would be the **best** estimate of the area of the circle inside the rectangle?

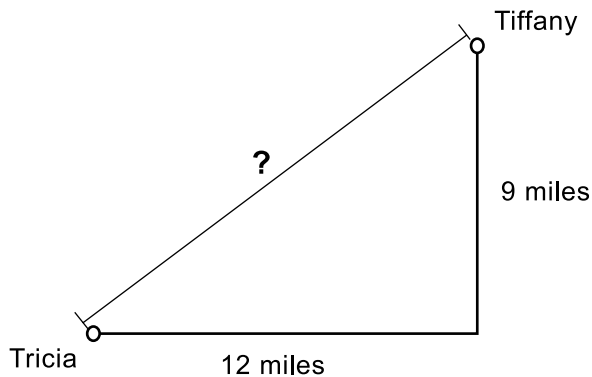
- A. 2 square units
- B. 4 square units
- \* C. 12 square units
- D. 24 square units

## PART II Released Items (Mathematics)

23. Andrew washed one of his mother's new rectangular place mats in hot water, and it shrank. If the original dimensions of the place mat were 16 inches by 12 inches and each dimension lost one inch, what was the difference in the area of the place mat before and after he washed it?

A. 2 square inches  
 B. 4 square inches  
 \* C. 27 square inches  
 D. 28 square inches

24. Tricia lives 12 miles west and 9 miles south of Tiffany. What is the distance (in miles) between where Tricia and Tiffany live?



A. 3  
 B. 11  
 \* C. 15  
 D. 21

25. How is the number *twenty-two million eight hundred ninety thousand six hundred* written in scientific notation?

A.  $2.28906 \times 10^5$   
 B.  $2.28906 \times 10^6$   
 \* C.  $2.28906 \times 10^7$   
 D.  $2.28906 \times 10^8$

26. Pluto requires 2,171,250 Earth hours to orbit the sun. Which of the following units would be the **most** manageable for measuring this time period?

A. minutes  
 B. days  
 C. weeks  
 \* D. years

27. Christine's alarm clock did not go off, making her 3 hours late for work. She makes \$15.00 per hour. She drove too fast and she received a \$75 speeding ticket. How much money did being late cost Christine?

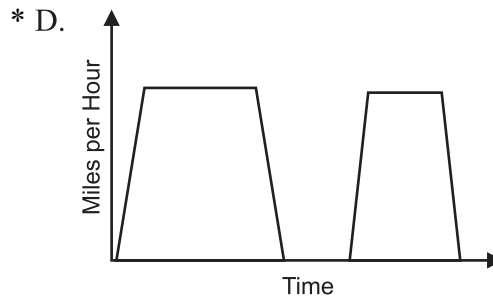
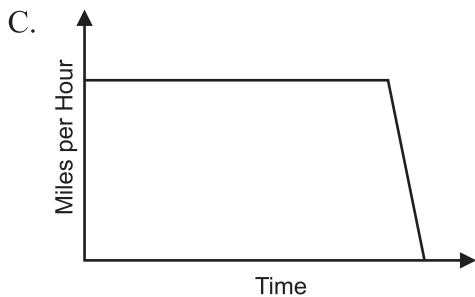
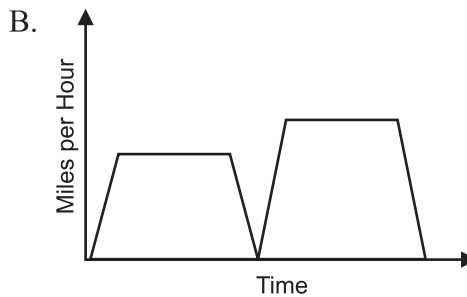
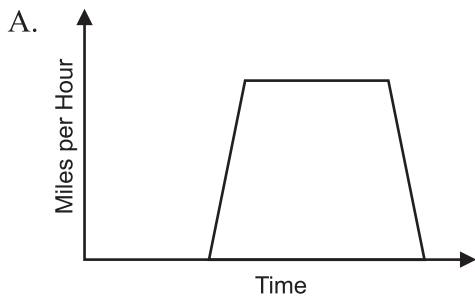
A. \$ 90  
 \* B. \$120  
 C. \$240  
 D. \$270

28. What is the distance between  $-2$  and  $5$  on a number line?

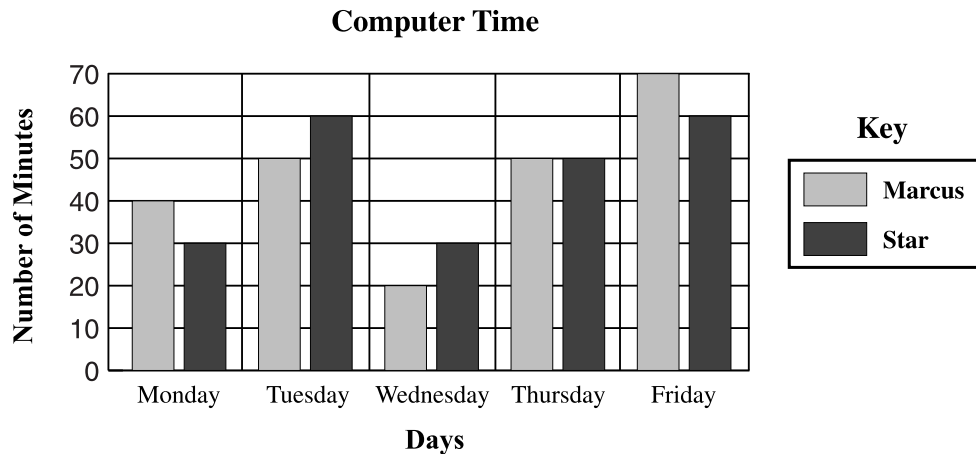
A. 3  
 B. 4  
 \* C. 7  
 D. 10

## PART II Released Items (Mathematics)

29. Each graph below describes a trip that Lawanda made to her grandmother's house. On which of the trips did Lawanda stop for lunch on the way to her grandmother's house?



Use the graph below to answer question 30.

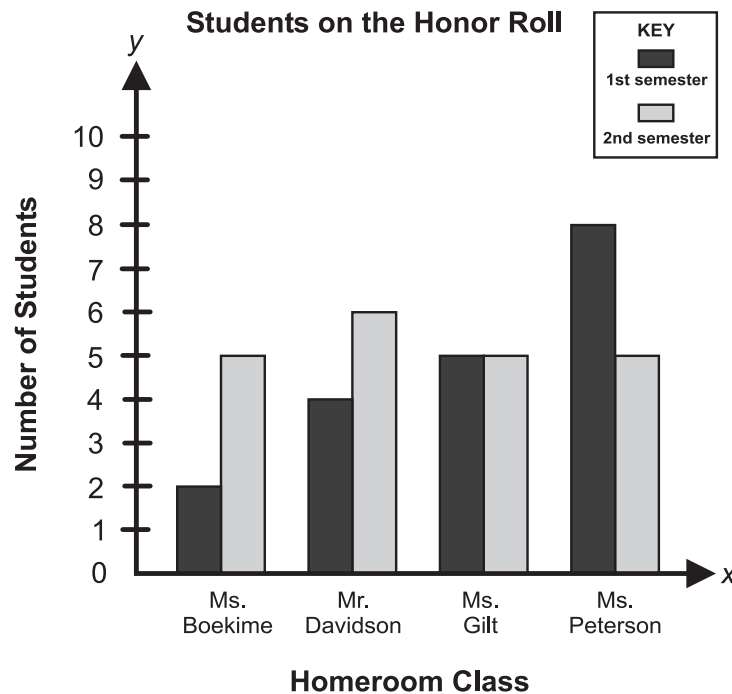


30. The graph above shows the amount of time that Marcus and Star each spent on the computer during one week while working on a science project. Which of the following statements is true about Marcus's and Star's computer time?
- A. Star spent more time on the computer than Marcus.
  - B. Marcus spent more time on the computer than Star.
  - C. Marcus spent less than 200 minutes on the computer.
  - \* D. Marcus and Star spent the same amount of time on the computer.



## PART II Released Items (Mathematics)

Use the graph below to answer question 31.



31. The double bar graph above shows the number of students on the honor roll for the two semesters of four homerooms at Montera Middle School. Which homeroom had the **greatest** increase in the number of students on the honor roll?

- \* A. Ms. Boekime
- B. Mr. Davidson
- C. Ms. Gilt
- D. Ms. Peterson

32. Ms. Jackson has 34 students, and Mr. Anderson has 27 students. A total of 49 students are going on a field trip from both classes. Mr. Anderson will not be taking 5 of his students. How many of Ms. Jackson's students will **not** be going on the field trip?

- A. 5
- \* B. 7
- C. 12
- D. 17

33. Linda is buying candy for a party. One type of candy is sold in packages of 6 pieces, another is sold in packages of 4 pieces, and the third type is sold in packages of 3 pieces. If Linda wants to buy the same amount of each type of candy, what is the **smallest** amount of each type of candy that she can buy?

- A. 6 pieces
- \* B. 12 pieces
- C. 24 pieces
- D. 72 pieces

**PART II Released Items (Mathematics)**

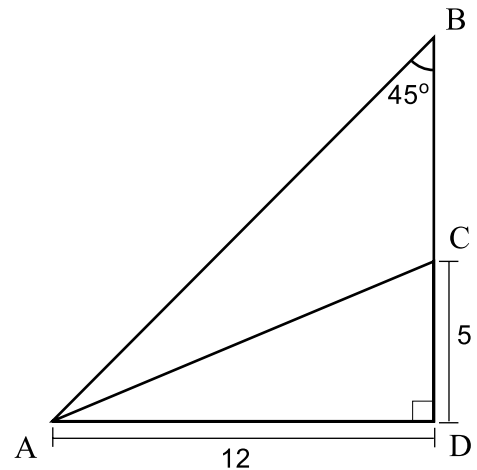
34. Luna decided to increase the length of time she rode her bicycle by half an hour. To do this, each day she added two minutes to the length of time that she rode her bicycle, starting on May 1st. On what day will she have increased the time she rode the bicycle by half an hour?

A. May 30th  
\* B. May 15th  
C. May 10th  
D. May 5th

35. The hiking club at Amelia Middle School is building a recycling bin. On the scale drawing, the bin is 8 centimeters tall and 24 centimeters long. If the actual bin is to be 2 meters tall, how long will it be?

\* A. 6 meters  
B. 12 meters  
C. 16 meters  
D. 18 meters

Use the diagram below to answer question 36.



36. What is the distance from B to C in the triangle shown above?

A. 5 units  
\* B. 7 units  
C. 12 units  
D. 13 units

37. Which of the following could be the next number in the sequence

{11, 13, 16, 20, 25 . . . }?

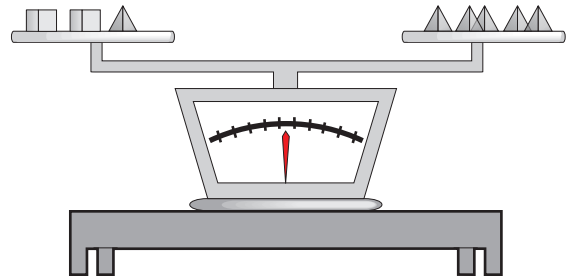
A. 26  
B. 27  
C. 30  
\* D. 31

## PART II Released Items (Mathematics)

38. A box contains 2 yellow, 6 orange, and 5 red crayons. If a crayon is randomly drawn from the box, what is the probability it will **not** be red?

- A.  $\frac{5}{13}$   
\* B.  $\frac{8}{13}$   
C.  $\frac{5}{8}$   
D.  $\frac{8}{5}$

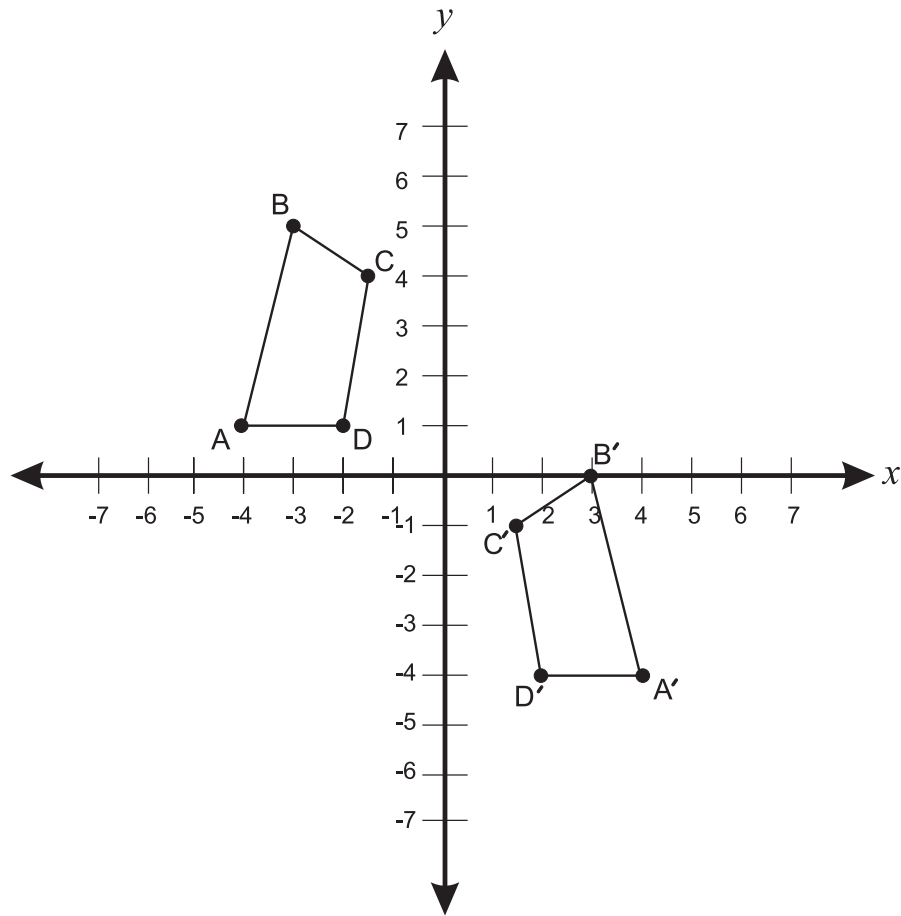
Use the diagram below to answer question 39.



39. The weight of 1 pyramid and 2 cubes is equal to the weight of 5 pyramids. How many pyramids would weigh the same as 1 cube?
- A. 1  
\* B. 2  
C. 4  
D. 5

**PART II Released Items (Mathematics)**

Use the diagram below to answer question 40.



40. Which of the following would transform quadrilateral ABCD to quadrilateral A'B'C'D'?
- A. a reflection across the  $y$ -axis and a reflection across the  $x$ -axis
  - \* B. a reflection across the  $y$ -axis and a slide down 5 units
  - C. a reflection across the  $x$ -axis and a slide up 5 units
  - D. a slide down 5 units and a slide right 5 units

**PART II Released Items (Mathematics)**

**MATHEMATICS OPEN-RESPONSE ITEM A**

- A.** On Tuesday, Bailey’s Ice Cream Parlor gave away free ice cream cones to every 6<sup>th</sup> customer and free banana splits to every 15<sup>th</sup> customer to celebrate their 25<sup>th</sup> year in business.
1. If 125 customers visited Bailey’s on Tuesday, what were the numbers of the customers who received both a free ice cream cone and a free banana split? Show your work.
  2. On Wednesday, Bailey’s Ice Cream Parlor gave away T-shirts and hats. Of the 85 customers, 5 received T-shirts and 12 received hats. What was the rule used to determine which customers received T-shirts? Show your work.
  3. What was the rule used to determine which customers received hats? Show your work.
  4. How many customers received both a hat and a T-shirt? Show your work.

BE SURE TO LABEL YOUR RESPONSES 1, 2, 3, AND 4.

**RUBRIC FOR MATHEMATICS OPEN-RESPONSE ITEM A**

<b>SCORE</b>	<b>DESCRIPTION</b>
<b>4</b>	4 points – Response contains no incorrect work.
<b>3</b>	3 – 3 ½ points.
<b>2</b>	2 – 2 ½ points.
<b>1</b>	½ – 1 ½ points or some minimal understanding shown.
<b>0</b>	No understanding shown.
<b>B</b>	Blank – No Response. A score of “B” will be reported as a score “NA” (No Attempt – Zero Score).

**PART II Released Items (Mathematics)**

**MATHEMATICS OPEN-RESPONSE ITEM B**

- B.** Mr. Teague glued 6 identical cubes together to make a rectangular prism. Each cube had an edge length of 1 centimeter. He then painted the outside of the prism.
1. If the final dimensions of the rectangular prism were 3 centimeters by 2 centimeters by 1 centimeter, how many of the faces of the 6 original cubes were painted? Show your work or provide an explanation for your answer.
  2. Did any cube have all six faces painted? Explain your answer.

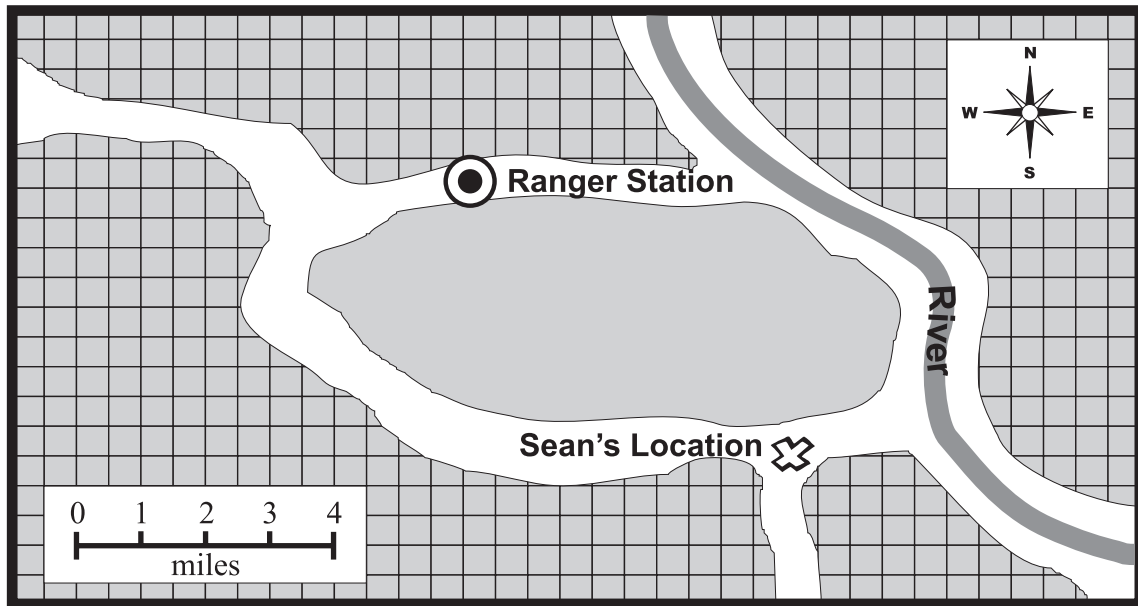
BE SURE TO LABEL YOUR RESPONSES 1 AND 2.

**RUBRIC FOR MATHEMATICS OPEN-RESPONSE ITEM B**

<b>SCORE</b>	<b>DESCRIPTION</b>
<b>4</b>	4 points.
<b>3</b>	3 points.
<b>2</b>	2 points.
<b>1</b>	1 point or some minimal understanding shown.
<b>0</b>	No understanding shown.
<b>B</b>	Blank – No Response. A score of “B” will be reported as a score “NA” (No Attempt – Zero Score).

**PART II Released Items (Mathematics)**

**MATHEMATICS OPEN-RESPONSE ITEM C**



- C. Sean is hiking through the woods and is using the map shown above to guide him to a ranger station. He comes to a fork in the path he is taking and stops to mark his current location. It is getting late, and he wants to be sure to take the shorter path to the station.
1. Estimate the number of degrees west of north the ranger station is in relation to Sean's current position. Explain how you found your answer.
  2. Sean decides that it is too risky to cut through the woods when it is so close to nightfall. Using the scale, estimate the distance to the station if Sean takes the path heading **east** to the river and then follows the path to the ranger station.
  3. Using the scale, estimate the distance to the station if Sean follows the path heading **west** to the ranger station.
  4. Based on your estimations, which path will be shorter for Sean to take?

BE SURE TO LABEL YOUR RESPONSES 1, 2, 3, AND 4.

**PART II Released Items (Mathematics)**

**MATHEMATICS OPEN-RESPONSE ITEM D**

Age of Volunteer	Rating of Cereal
34	60
12	90
14	95
35	45
22	75
4	80
40	45
12	95
53	25
7	85
18	75
40	40
10	80

- D.** A company that makes breakfast cereal has asked volunteers of various ages to try its newest cereal and fill out a questionnaire which results in a rating of 0 to 100 for the new product. The ages of the volunteers and the ratings they gave to the cereal are shown, in no particular order, on the table above.
1. Redraw the table, organizing the data so that the ages of the volunteers are in order from youngest to oldest.
  2. What general trend can be observed in the data on your chart regarding the relationship between the rating and the age of the volunteer?
  3. The cereal-makers want to target the age group that liked the cereal the best. What age group should the cereal-makers target in their advertising? Give a reason for your answer.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.



**PART II Released Items (Mathematics)**

**MATHEMATICS OPEN-RESPONSE ITEM E**

- E.** Jason’s father is having gravel delivered to his house. He must pay \$75 per ton of gravel and a one-time delivery fee of \$50.00.
1. How much would it cost Jason’s father to have a truck driver deliver 5 tons of gravel to his house?
  2. How much would it cost Jason’s father to have a truck driver deliver 10 tons of gravel to his house?
  3. Graph the two points from parts 1 and 2 on the grid provided, placing the number of tons of gravel on the  $x$ -axis and the cost on the  $y$ -axis. Sketch a line through the points.
  4. What is the  $y$ -intercept of the line you sketched in part 3?
- BE SURE TO LABEL YOUR RESPONSES 1, 2, 3, AND 4.

**RUBRIC FOR MATHEMATICS OPEN-RESPONSE ITEM E**

<b>SCORE</b>	<b>DESCRIPTION</b>
<b>4</b>	5 points.
<b>3</b>	3 – 4 points.
<b>2</b>	2 points.
<b>1</b>	1 point or some minimal understanding shown (i.e., Parts 1 and/or 2 incorrect due to calculation or copy error with no credit in other parts).
<b>0</b>	No understanding shown.
<b>B</b>	Blank – No Response. A score of “B” will be reported as a score “NA” (No Attempt – Zero Score).

## PART IV Item Correlation with Curriculum Frameworks

### Released Items for Mathematics\*

Strands	Content Standards
1. NUMBER SENSE, PROPERTIES AND OPERATIONS (NPO)	1. The student will communicate an understanding of the properties of numbers and operations (add, subtract, multiply, divide). 2. The student will demonstrate and apply knowledge of numbers and numerical relationships to real-world situations.
2. GEOMETRY AND SPATIAL SENSE (GS)	1. The student will demonstrate, construct, communicate, and apply the properties of geometric shapes and spatial sense to connect geometry with problem-solving situations.
3. MEASUREMENT (M)	1. The student will use measurement attributes (length, weight, mass, area, volume, time, money, temperature, scale, and angle) to describe and compare mathematical and real-world objects. 2. The student will demonstrate the appropriate use of measuring instruments. 3. The student will apply measurement concepts to solve problems inside and outside the field of mathematics.
4. DATA ANALYSIS, STATISTICS AND PROBABILITY (DSP)	1. The student will perform the steps that comprise data analysis, from gathering information to communicating results. 2. The student will use probability models to perform experiments and simulations. 3. The student will apply probability and statistical concepts in problem-solving and decision-making situations.
5. PATTERNS, ALGEBRA AND FUNCTIONS (PAF)	1. The student will use the language/symbols of algebra to represent patterns and functions. 2. The student will use algebraic concepts to model, to solve, and to test solutions of mathematical and real-world problems.

Item	Strand	Content Standard	Student Learning Expectation
1	M	1	1
2	DSP	1	1
3	PAF	1	1
4	M	1	1
5	GS	1	1
6	DSP	3	3
7	NPO	2	3
8	GS	1	1
9	NPO	1	1
10	M	1	3
11	NPO	1	2
12	DSP	2	2
13	GS	1	2
14	M	1	2
15	DSP	3	2
16	NPO	2	3
17	PAF	2	2
18	GS	1	1
19	PAF	2	2
20	M	3	1
21	DSP	1	3
22	GS	1	4
23	M	1	2

Item	Strand	Content Standard	Student Learning Expectation
24	GS	1	2
25	NPO	2	3
26	M	2	1
27	PAF	2	3
28	NPO	2	4
29	PAF	1	3
30	DSP	1	2
31	DSP	1	2
32	PAF	2	3
33	NPO	1	2
34	PAF	2	1
35	M	3	3
36	GS	1	1
37	NPO	1	1
38	DSP	2	2
39	PAF	1	2
40	GS	1	3
A	NPO	1	2
B	GS	1	1
C	M	1	1
D	DSP	1	1
E	PAF	2	5

\*Only the predominant Strand, Content Standard, and Student Learning Expectation is listed for the Mathematics and Reading items.