

# Mathematics

## SESSION 1

You may use your tool kit and reference sheet during this session.  
You may **not** use a calculator during this session.



### DIRECTIONS

This session contains twelve multiple-choice questions, two short-answer questions, and three open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

- 1 Johannah collects posters. She has 3 animal posters, 4 posters of sports teams, and 2 posters of musical bands. What fraction of her posters is of sports teams?
- A.  $\frac{2}{9}$
- B.  $\frac{3}{9}$
- C.  $\frac{4}{9}$
- D.  $\frac{5}{9}$

- 2 Diana made the diagram below to find the next term in a number pattern.

Number  
Pattern 1, 3, 9, 11, 33,    ,    ,    ?

Diana's  
Work  $\begin{array}{ccccccc} \diagdown & \diagup & \diagdown & \diagup & \diagdown & \diagup & \diagdown & \diagup \\ +2 & \times 3 & +2 & \times 3 & & & & \end{array}$

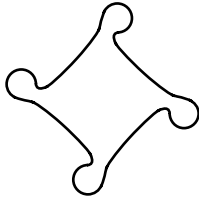
What should Diana write as the eighth term in the number pattern?

- A. 37
- B. 41
- C. 105
- D. 107

- 3 Emil, Logan, Stacey, and Stephanie took a test. Their test scores were 95, 70, 81, and 78, respectively. What was the **mean** of their test scores?
- A. 79.5
- B. 81
- C. 88.5
- D. 324

4 Which figure below has a single line of symmetry?

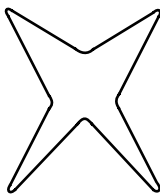
A.



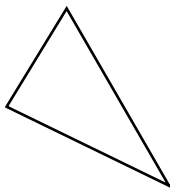
B.



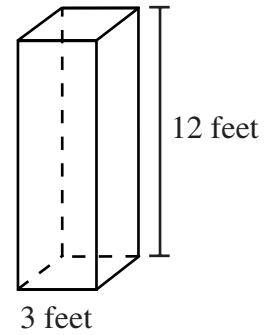
C.



D.



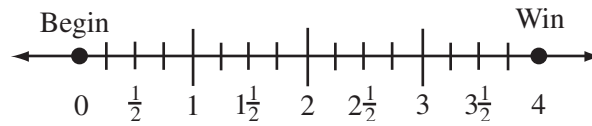
5 The base of the rectangular prism shown below is a 3-foot square.



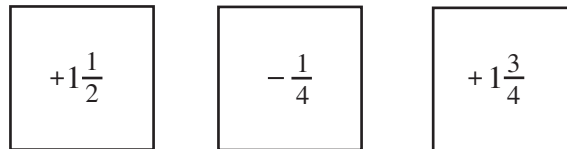
What is the volume of the prism?

- A. 108 cubic feet
- B. 144 cubic feet
- C. 324 cubic feet
- D. 432 cubic feet

- 6 In the number line game below, each player begins at 0 and draws a card. The players move along the number line by adding the value of the card to the number they are at on the number line. The first player to land on 4 wins.



Joan's first three cards are shown below.



What would Joan's fourth card need to be for her to land on 4?

- A.
- B.
- C.
- D.

- 7 What is the value of the expression below when  $x = 3$ ?

$$4x + 1$$

- A. 7
- B. 8
- C. 12
- D. 13

- 8 The chart below shows the amount of each spice required by a recipe for candied yams.

| Spice    | Amount             |
|----------|--------------------|
| Nutmeg   | $\frac{1}{4}$ tsp. |
| Ginger   | $\frac{3}{4}$ tsp. |
| Cinnamon | $\frac{1}{2}$ tsp. |
| Mace     | $\frac{3}{8}$ tsp. |

The recipe requires the **greatest** amount of which spice?

- A. cinnamon
- B. nutmeg
- C. mace
- D. ginger

Use the image below to answer question 9.



- 9 Which of the following shows the image above reflected over the dotted line?

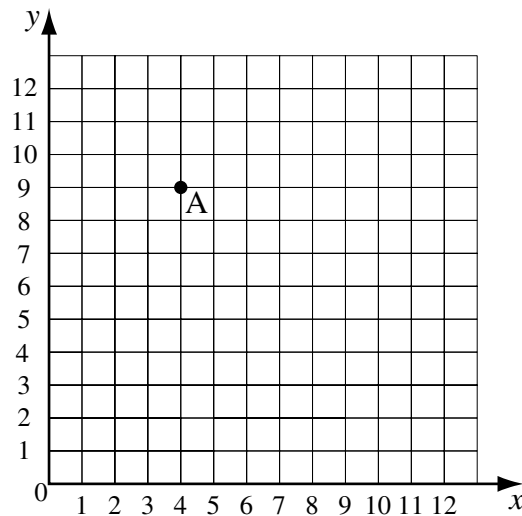
- A.
- B.
- C.
- D.

Question 10 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (drawings, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 10 in the space provided in your Student Answer Booklet.

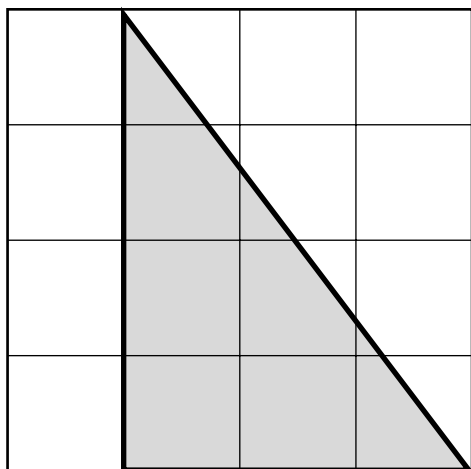
Use the graph below to answer question 10.



- 10
- What are the coordinates of point  $A$  on the graph above?
  - Create a graph like the one shown above in your Student Answer Booklet. Graph a point whose coordinates are  $(7, 4)$ . Label the point  $C$ .
  - Graph a point,  $B$ , on the graph so that angle  $ABC$  is a right angle. Be sure to label the point  $B$ . What are the coordinates of point  $B$ ?
  - Graph a point,  $D$ , on the graph so that quadrilateral  $ABCD$  is a trapezoid. Be sure to label the point  $D$ . What are the coordinates of point  $D$ ? Explain why the figure is a trapezoid.

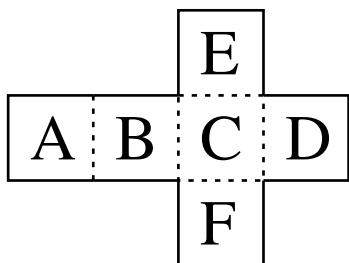
Questions 11 and 12 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

- 11 What is the area, in square units, of the shaded triangle shown below?



represents 1 square unit.

- 12 Ming folded the pattern below along the dotted lines to form a cube.



When folded, which letter will be opposite letter C?

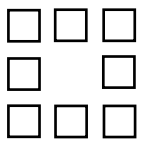
Question 13 is an open-response question.

- BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.
- Show all your work (drawings, tables, or computations) in your Student Answer Booklet.
- If you do the work in your head, explain in writing how you did the work.

Write your answer to question 13 in the space provided in your Student Answer Booklet.

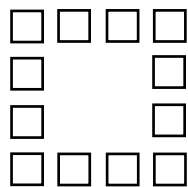
**13** The first four figures in a pattern are shown below.

**Figure 1**



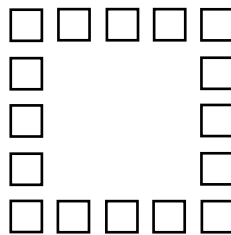
8 tiles

**Figure 2**



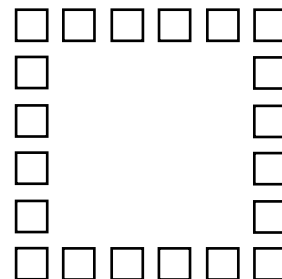
12 tiles

**Figure 3**



16 tiles

**Figure 4**



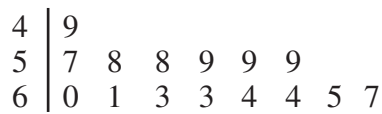
20 tiles

- Based on the pattern above, draw Figure 5.
- How many tiles will be in Figure 7?
- Using words or symbols, write an expression for determining the number of tiles in Figure  $n$ .
- If the pattern continues, which figure will contain exactly 160 tiles? Show or explain your work.

Mark your answers to multiple-choice questions 14 through 16 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

- 14 Coach Chin recorded the heights of the students in his sixth-grade gym class on the stem-and-leaf plot below.

Height (in inches)

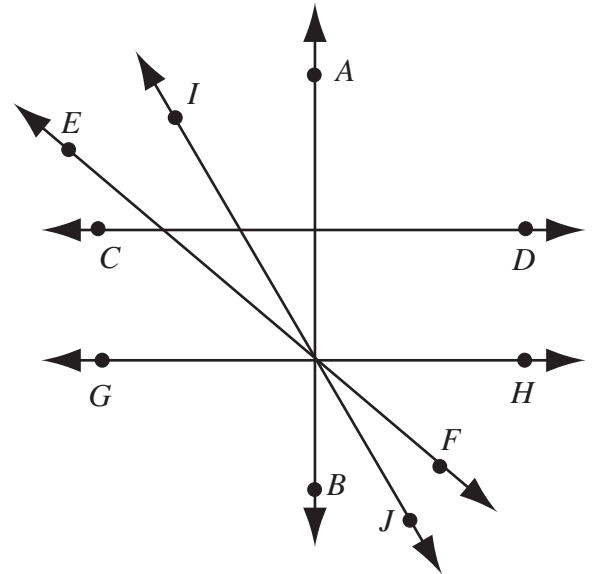


|          |
|----------|
| KEY      |
| 6 2 = 62 |

Which of the following is the most common height in Coach Chin's class?

- A. 3 inches
  - B. 9 inches
  - C. 59 inches
  - D. 60 inches
- 15 The distance between Humphrey's house and the local amusement park is 20 miles. If he is using a scale of 1 inch to 10 miles to draw a map, how many inches on the map should be between his house and the amusement park?
- A.  $\frac{1}{2}$  inch
  - B. 2 inches
  - C. 10 inches
  - D. 30 inches

Use the figure below to answer question 16.



- 16 Which of the following lines appears to be perpendicular to  $\overleftrightarrow{CD}$ ?
- A.  $\overleftrightarrow{AB}$
  - B.  $\overleftrightarrow{EF}$
  - C.  $\overleftrightarrow{GH}$
  - D.  $\overleftrightarrow{IJ}$



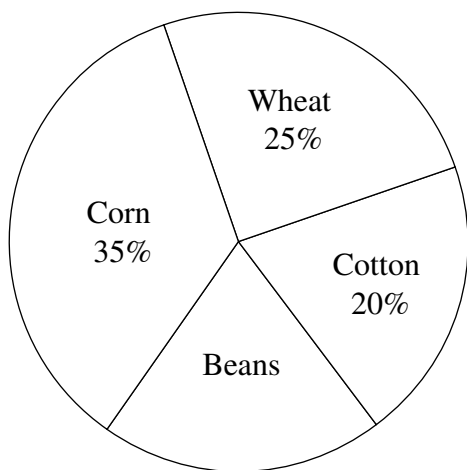
Question 17 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (drawings, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 17 in the space provided in your Student Answer Booklet.

- 17** Mr. Riley grows four different crops on his 300-acre farm. Each acre has the same number of plants. The circle graph below shows what percent of the total number of acres is planted in each crop.

**Crops Planted on Mr. Riley's Farm**



- What percent of Mr. Riley's farm is planted in beans? Show or explain your work.
- How many acres of wheat are planted in Mr. Riley's farm? Show or explain your work.
- Mr. Riley thinks that if he plants wheat in all of the acres that are beans, more than half his farm would be wheat. Is he correct? Why or why not? Show or explain your work.

# Mathematics

## SESSION 2

You may use your tool kit and reference sheet during this session.  
You may **not** use a calculator during this session.



### DIRECTIONS

This session contains seventeen multiple-choice questions, three short-answer questions, and two open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

- 18 Ms. Wood asked each student to write on a piece of paper one place that he or she would like to visit on a class field trip. The results are shown in the chart below.

**Field Trip Choices**

| Place to Visit | Number of Student Choices |
|----------------|---------------------------|
| science museum | 9                         |
| water park     | 3                         |
| power plant    | 4                         |
| history museum | 7                         |
| zoo            | 5                         |

Ms. Wood placed each student's paper in a bag and drew one paper at random. What is the probability she drew a piece of paper that had the science museum written on it?

- A.  $\frac{1}{28}$
- B.  $\frac{1}{5}$
- C.  $\frac{9}{28}$
- D.  $\frac{9}{5}$

19 Which of the following expressions has the **greatest** numerical value?

- A.  $2 \times 10^3$
- B.  $4 \times 10^5$
- C.  $5 \times 10^4$
- D.  $7 \times 10^2$

20 Marty began a pattern with the number 3. He obtained all of the other terms in the pattern by multiplying the previous term by 2 or by 3 alternately as shown below.

3, 6, 18, 36, 108, 216, . . .

What is the next term in Marty's pattern?

- A. 324
- B. 432
- C. 540
- D. 648

21 Students in Mr. Jacob's English class were giving speeches. Each student's speech was 7 to 10 minutes long. Which of the following is the **best** estimate for the total number of student speeches that could be given in a 2-hour class?

- A. 4 speeches
- B. 8 speeches
- C. 13 speeches
- D. 19 speeches

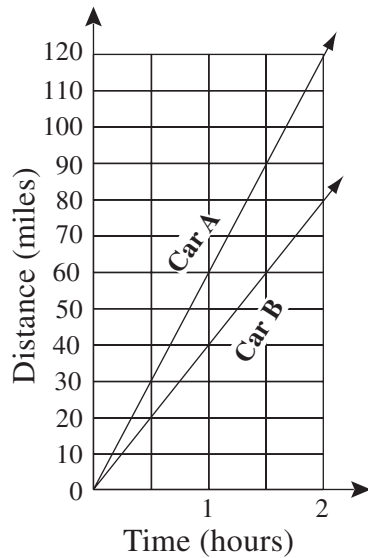
22 In the equation below, if  $x$  has a value of 3, what is the value of  $y$ ?

$$y = 3x - 1$$

- A.  $y = 5$
- B.  $y = 6$
- C.  $y = 8$
- D.  $y = 10$

- 23 The graph below shows the distance Car A and Car B traveled in two hours on the same road in the same direction.

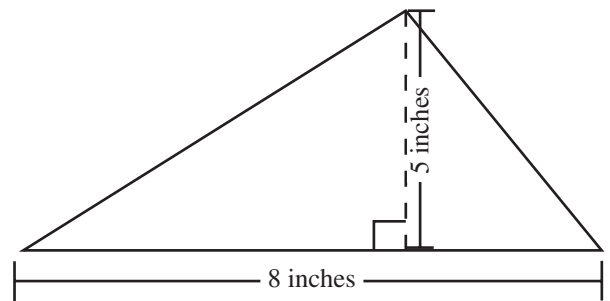
**Distance Traveled in Car**



Which of the following statements is true about the difference between the distance traveled by Car A and the distance traveled by Car B as time progresses?

- A. The difference in the distance between Car A and Car B decreases.
- B. The difference in the distance between Car A and Car B increases.
- C. The difference in the distance between Car A and Car B stays the same.
- D. The difference in the distance between Car A and Car B is zero.

- 24 What is the area of the triangle shown below?



- A. 10 square inches
- B. 12.5 square inches
- C. 20 square inches
- D. 40 square inches

25 Which set of data below does **not** show a constant rate of change?

A.

| Cups of Flour | Cookies Made |
|---------------|--------------|
| 2             | 24           |
| 4             | 48           |
| 6             | 72           |

B.

| Number of Books | Price Paid |
|-----------------|------------|
| 6               | \$30.00    |
| 12              | \$60.00    |
| 18              | \$90.00    |

C.

| Time    | Pages Read |
|---------|------------|
| 2 hours | 80         |
| 4 hours | 160        |
| 6 hours | 240        |

D.

| Games | Total Points Scored |
|-------|---------------------|
| 3     | 15                  |
| 6     | 20                  |
| 12    | 25                  |

26 If  $\frac{1}{4} \times 2 \times \square = \frac{1}{4} \times 16$ , what is the value of  $\square$ ?

A.  $\square = 4$

B.  $\square = 6$

C.  $\square = 8$

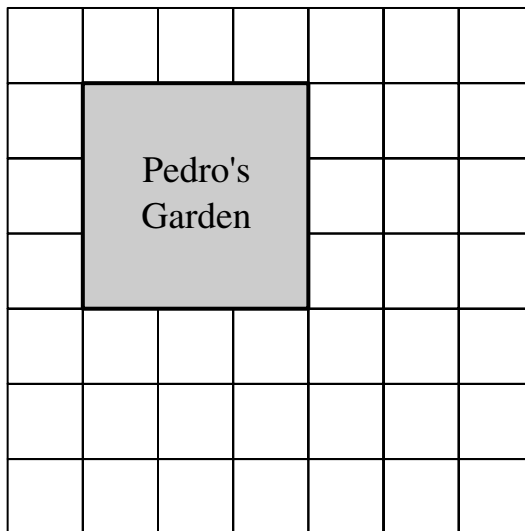
D.  $\square = 14$

Question 27 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (drawings, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 27 in the space provided in your Student Answer Booklet.

- 27** In the grid below, each square represents one square yard of land. Twenty carrot plants can fit in one square yard of land.



represents 1 square yard.

- How many square yards are in Pedro’s garden? How many plants can fit in Pedro’s garden? Show or explain your work.
- How many yards of fencing does Pedro need to enclose his garden? Show or explain your work.
- Sean encloses a rectangular garden with 16 yards of fencing. Is it possible that Pedro’s garden can contain more plants than Sean’s garden? If not, explain why not. If so, draw an example on the grid in your answer booklet and tell how many plants can fit in Sean’s and Pedro's gardens. Show or explain your work.

Questions 28, 29, and 30 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

- 28 In the input-output table below, what will be the value of  $y$  when  $x = 5$ ?

| Input | Output |
|-------|--------|
| $x$   | $y$    |
| 2     | 5      |
| 3     | 7      |
| 4     | 9      |
| 5     | ?      |

- 29 A gumball machine has an equal number of gumballs in 6 different colors: red, yellow, blue, green, orange, and white. If the machine contains 300 gumballs, and Lamar puts one coin into the machine, what is the probability that he will get a blue gumball?

- 30 Jeremy and Stephen are playing a game called “Guess My Number.” Jeremy gave Stephen the following clues.

- The number has four digits.
- The thousands digit is twice the hundreds digit.
- The ones digit is divisible by five.
- The sum of the digits is 13.

What could be Jeremy’s number?

Question 31 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (drawings, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 31 in the space provided in your Student Answer Booklet.

- 31** Ms. York gave a math quiz to each of her two classes. The quiz scores of each class are shown below.

|                    | <b>Morning Class Quiz Scores</b>               | <b>Afternoon Class Quiz Scores</b>     |
|--------------------|--|--|
| <b>Quiz Scores</b> | 91, 80, 75, 80, 60, 87, 80, 88, 90, 87, 92, 98 | 80, 87, 90, 70, 93, 80, 85, 90, 95, 80 |
| Mean               | 84   | ?                                      |
| Median             | 87   | ?                                      |
| Mode               | 80   | ?                                      |

- In your Student Answer Booklet, draw a stem-and-leaf plot that displays the afternoon class quiz scores. Make sure to include a key.
- Determine the mean, median, and mode of the quiz scores for the afternoon class. Show or explain your work.
- Which class do you think did better on the quiz? Show or explain your work.
- If Ms. York wants to compute the overall mean of the scores from both classes, can she do this by taking the average of both means? Explain why or why not.



Mark your answers to multiple-choice questions 32 through 39 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

- 32 Agnes earns  $d$  dollars for babysitting each week. She also receives an allowance of \$10 per week. The expression below can be used to calculate the amount of money she will have at the end of 5 weeks.

$$(10 + d) \times 5$$

What is the amount of money Agnes will have at the end of five weeks if  $d = \$25$ ?

- A. \$125
- B. \$135
- C. \$175
- D. \$260

- 33 Lisa has three jobs: walking the family dog, washing the dishes, and vacuuming.

- She walks the family dog once every 3 days.
- She washes the dishes once every 4 days.
- She vacuums once every 6 days.

The calendar below shows that Lisa did all three jobs on Monday the 2nd.

**Calendar**

| S  | M                       | T  | W  | Th | F  | S  |
|----|-------------------------|----|----|----|----|----|
| 1  | Dog<br>Dishes<br>Vacuum | 3  | 4  | 5  | 6  | 7  |
| 8  | 9                       | 10 | 11 | 12 | 13 | 14 |
| 15 | 16                      | 17 | 18 | 19 | 20 | 21 |
| 22 | 23                      | 24 | 25 | 26 | 27 | 28 |
| 29 | 30                      | 31 |    |    |    |    |

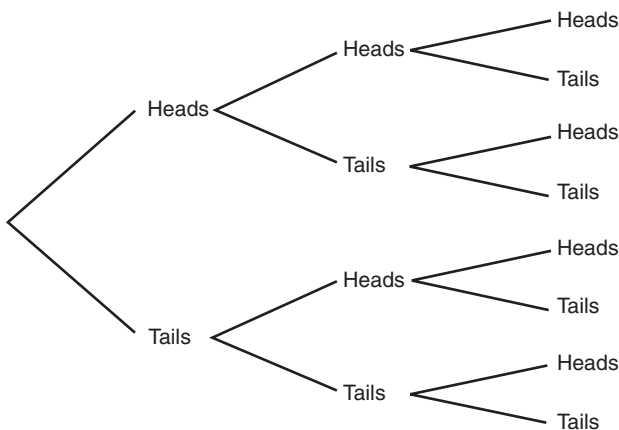
On which day will Lisa again do all three jobs on the same day?

- A. Thursday the 5th
- B. Saturday the 14th
- C. Wednesday the 18th
- D. Tuesday the 24th

34 What is the prime factorization of 72?

- A.  $2 \times 3^2 \times 4$
- B.  $2^2 \times 3^3$
- C.  $2^3 \times 3^2$
- D.  $2^4 \times 3^2$

35 Tess will toss a fair coin 3 times. The possible results are illustrated in the tree diagram below.



Based on the information given in the tree diagram, in how many ways (outcomes) can Tess toss **at least 2 heads**?

- A. 2
- B. 3
- C. 4
- D. 5

36 The radius of a circular table is 13 inches. What is the diameter of the table?

- A. 6.5 inches
- B. 13 inches
- C. 15 inches
- D. 26 inches

37 Based on the information given in the table shown below, which of the following equations correctly states the relationship between  $x$  and  $y$ ?

| $x$ | $y$ |
|-----|-----|
| 1   | 3   |
| 2   | 4   |
| 3   | 5   |
| 4   | 6   |
| 5   | 7   |

- A.  $y = 2x$
- B.  $y = x \div 2$
- C.  $y = x + 2$
- D.  $y = x - 2$

- 38 What is the following number in standard form?

$$2 + (8 \times 0.1) + (6 \times 0.01) + (4 \times 0.001)$$

- A. 0.2864
- B. 2.864
- C. 28.64
- D. 2864

- 39 A baseball team won 75% of its games. If the team played 48 games, how many games did it win?

- A. 36
- B. 25
- C. 12
- D. 9

**Grade 6 Mathematics**  
**Spring 2003 Released Items:**  
**Reporting Categories, Standards, and Correct Answers**

| Item No. | Page No. | Reporting Category                                | Standard | Correct Answer (MC/SA)*  |
|----------|----------|---|----------|--|
| 1        | 145      | <i>Number Sense and Operations</i>                | 6.N.4    | C  |
| 2        | 145      | <i>Patterns, Relation, and Algebra</i>            | 6.P.1    | D  |
| 3        | 145      | <i>Data Analysis, Statistics, and Probability</i> | 6.D.1    | B  |
| 4        | 146      | <i>Geometry</i>                                   | 6.G.7    | C  |
| 5        | 146      | <i>Measurement</i>                                | 6.M.6    | A  |
| 6        | 147      | <i>Number Sense and Operations</i>                | 6.N.10   | B  |
| 7        | 148      | <i>Patterns, Relation, and Algebra</i>            | 6.P.2    | D  |
| 8        | 148      | <i>Number Sense and Operations</i>                | 6.N.7    | D  |
| 9        | 148      | <i>Geometry</i>                                   | 6.G.6    | A  |
| 10       | 149      | <i>Geometry</i>                                   | 6.G.4    |  |
| 11       | 150      | <i>Measurement</i>                                | 6.M.4    | 6 square units   |
| 12       | 150      | <i>Geometry</i>                                   | 6.G.9    | A  |
| 13       | 151      | <i>Patterns, Relation, and Algebra</i>            | 6.P.1    |  |
| 14       | 152      | <i>Data Analysis, Statistics, and Probability</i> | 6.D.2    | C  |
| 15       | 152      | <i>Measurement</i>                                | 6.M.3    | B  |
| 16       | 152      | <i>Geometry</i>                                   | 6.G.3    | A  |
| 17       | 153      | <i>Number Sense and Operations</i>                | 6.N.13   |  |
| 18       | 154      | <i>Data Analysis, Statistics, and Probability</i> | 6.D.4    | C  |
| 19       | 155      | <i>Number Sense and Operations</i>                | 6.N.1    | B  |
| 20       | 155      | <i>Patterns, Relation, and Algebra</i>            | 6.P.1    | D  |
| 21       | 155      | <i>Number Sense and Operations</i>                | 6.N.16   | C  |
| 22       | 155      | <i>Patterns, Relation, and Algebra</i>            | 6.P.5    | C  |
| 23       | 156      | <i>Patterns, Relation, and Algebra</i>            | 6.P.4    | B  |
| 24       | 156      | <i>Measurement</i>                                | 6.M.4    | C  |
| 25       | 157      | <i>Patterns, Relation, and Algebra</i>            | 6.P.7    | D  |
| 26       | 157      | <i>Patterns, Relation, and Algebra</i>            | 6.P.3    | C  |
| 27       | 158      | <i>Measurement</i>                                | 6.M.1    |  |
| 28       | 159      | <i>Patterns, Relation, and Algebra</i>            | 6.P.4    | 11   |
| 29       | 159      | <i>Data Analysis, Statistics, and Probability</i> | 6.D.4    | $\frac{1}{6}$ or equivalent  |
| 30       | 159      | <i>Number Sense and Operations</i>                | 6.N.2    | Any one of the following numbers:<br>2155, 4225, 4270, 6340, or 8410 |
| 31       | 160      | <i>Data Analysis, Statistics, and Probability</i> | 6.D.1    |  |
| 32       | 161      | <i>Patterns, Relation, and Algebra</i>            | 6.P.2    | C  |
| 33       | 161      | <i>Number Sense and Operations</i>                | 6.N.8    | B  |
| 34       | 162      | <i>Number Sense and Operations</i>                | 6.N.8    | C  |
| 35       | 162      | <i>Data Analysis, Statistics, and Probability</i> | 6.D.3    | C  |
| 36       | 162      | <i>Measurement</i>                                | 6.M.5    | D  |
| 37       | 162      | <i>Patterns, Relation, and Algebra</i>            | 6.P.5    | C  |
| 38       | 163      | <i>Number Sense and Operations</i>                | 6.N.3    | B  |
| 39       | 163      | <i>Number Sense and Operations</i>                | 6.N.9    | A  |

\* Answers are provided here for multiple-choice and short-answer items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's website later this year.