Student Name: _____

# Ohio Achievement Tests

**Grade 6**

## Mathematics

## Student Test Booklet

March 2006

*This test was originally administered to students in March 2006.*
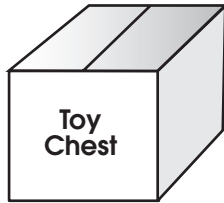
*This publicly released material is appropriate for use by Ohio teachers in instructional settings. This test is aligned with Ohio's Academic Content Standards for Mathematics.*

1.  Which number equals 0.25 × 0.3?

    A.  0.075

    B.  0.75

    C.  7.5

    D.  75.0

2.  Joe wants to paint the outside of the toy chest shown.

    

    Which measure of the toy chest should he use to determine how much paint to buy?

    A.  height

    B.  perimeter

    C.  surface area

    D.  volume

3.  What is a triangle with exactly two congruent sides and exactly two congruent angles called?

    A.  equilateral

    B.  isosceles

    C.  right

    D.  scalene

4.  Simplify:  $4^2 \div (8 - 4)$

    A.  –3
    B.  –2
    C.   2
    D.   4

5.  Square floor tiles will be put on the floor of a school hallway. Each tile is 1 foot by 1 foot. The hallway is 85 feet long and 8 feet wide.

    About how many tiles will be needed to cover the floor of the hallway?

    A.    95 tiles
    B.   100 tiles
    C.   200 tiles
    D.   700 tiles

6. Jeff drew a pattern of dots and made the table shown to describe the pattern.



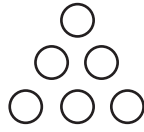Figure 1    Figure 2    Figure 3    Figure 4
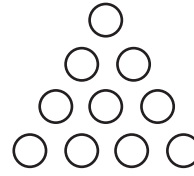
| Figure | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Number of Dots | 1 | 3 | 6 | 10 | 15 | 21 |

In your **Answer Document**, write a rule that Jeff can use to find the number of dots for any figure in this pattern. Show or explain your answer.
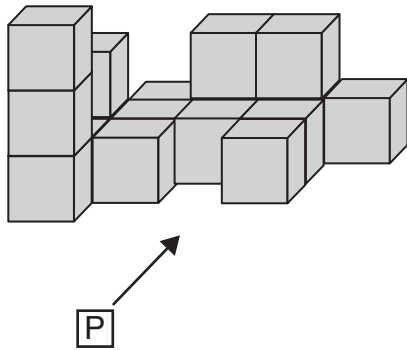
For question 6, respond completely in your **Answer Document**. (2 points)

7. Sarah used the associative property to find an expression equivalent to $5 \times (a \times 7)$.

Which expression did Sarah use?

A. $(5 \times a) + (5 \times 7)$

B. $(5 + a) \times (5 + 7)$

C. $(5 \times a) \times 7$

D. $5 \times (7 \times a)$

8. A playground has a set of big blocks for children to climb on as shown.



P

What does this set of blocks look like when viewed from point P, the front view?
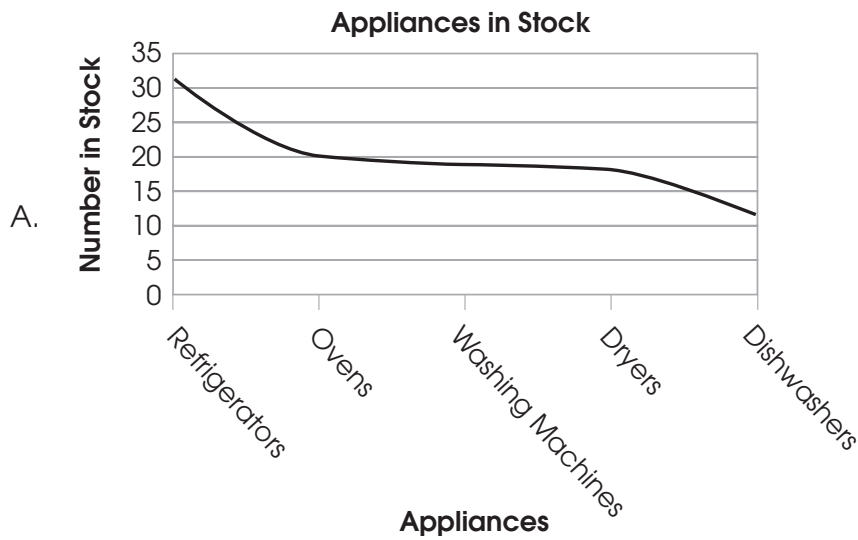
A.



B.



C.



D.

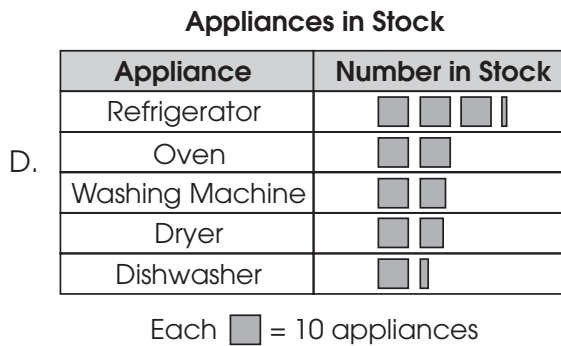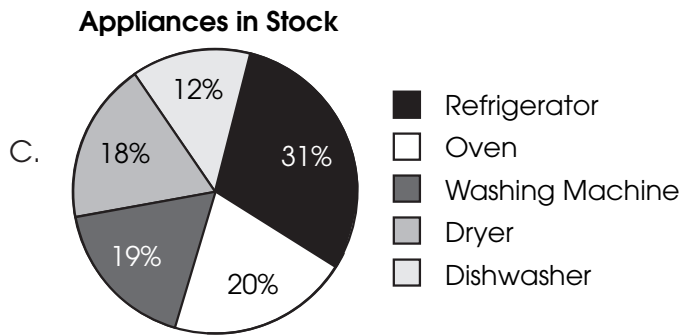Go to next page

9. The table shows the number of appliances in stock at King's Appliance store.

**Appliances in Stock**

| Appliance | Number |
|---|---|
| Refrigerator | 31 |
| Oven | 20 |
| Washing Machine | 19 |
| Dryer | 18 |
| Dishwasher | 12 |

Which graph best shows the fractional part of the total number of appliances for each appliance in stock?

A.



**Appliances in Stock**

Number in Stock

Appliances

B.

**Appliances in Stock**



**Number in Stock**

C.

**Appliances in Stock**



- ■ Refrigerator
- □ Oven
- ■ Washing Machine
- ■ Dryer
- □ Dishwasher

**Appliances in Stock**

D.

| Appliance | Number in Stock |
|---|---|
| Refrigerator | ■ ■ ■ ▮ |
| Oven | ■ ■ |
| Washing Machine | ■ ■ |
| Dryer | ■ ■ |
| Dishwasher | ■ ▮ |
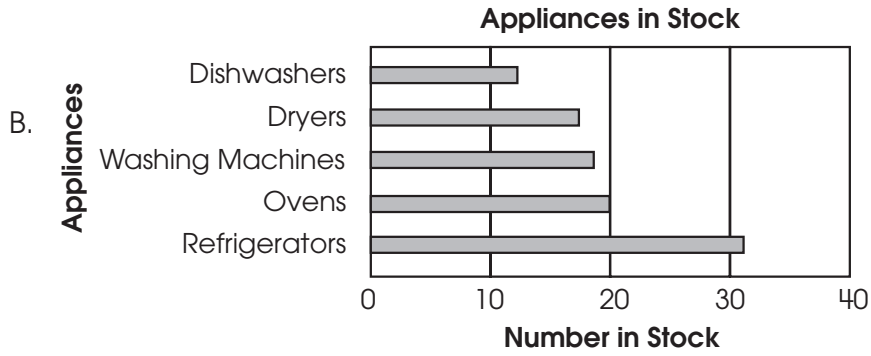
Each ■ = 10 appliances

16. The original cost of the guitar that Jane wants to buy is $240 in two different stores. Sam's Music is having a sale where guitars are discounted by 30%. Melody Music is offering a $45 discount on the same guitar.

    In your **Answer Document**, explain which store is offering the better deal. Show work or provide an explanation to support your answer.

For question 16, respond completely in your **Answer Document**. (2 points)

17. The frequency table shows the number of cousins for 29 students.

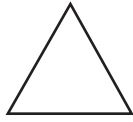| Number of Cousins | Number of Students |
|---|---|
| 1 | JHH II |
| 2 | JHH |
| 3 | JHH II |
| 4 | IIII |
| 5 | IIII |
| 6 | II |

Which statement is true about these data?

A. There is no mode.

B. There is one mode.

C. There are two modes.

D. There are six modes.

18. Three triangles are shown.



**Triangle X**     **Triangle Y**     **Triangle Z**

Which is the best description of triangles X, Y and Z?

A.  Triangle X is right scalene, triangle Y is acute equilateral, and triangle Z is obtuse isosceles.

B.  Triangle X is obtuse scalene, triangle Y is right equilateral, and triangle Z is acute isosceles.

C.  Triangle X is right isosceles, triangle Y is acute scalene, and triangle Z is obtuse equilateral.

D.  Triangle X is acute equilateral, triangle Y is obtuse isosceles, and triangle Z is right scalene.

19. Andrew buys books and videos in a store. He uses the expression $6b + 12v$ to find the cost of what he is buying, where $b$ is the number of books and $v$ is the number of videos he buys.

Use the expression to find the total cost of 4 books and 5 videos.

A.  $27

B.  $54

C.  $78

D.  $84

20. Which table shows a constant rate of decrease?

A.

| Input | Output |
|-------|--------|
| 54 | 36 |
| 55 | 23 |
| 56 | 15 |
| 57 | 7 |

B.

| Input | Output |
|-------|--------|
| 54 | 36 |
| 55 | 18 |
| 56 | 9 |
| 57 | 3 |

C.

| Input | Output |
|-------|--------|
| 54 | 23 |
| 55 | 21 |
| 56 | 19 |
| 57 | 17 |

D.

| Input | Output |
|-------|--------|
| 54 | 23 |
| 55 | 22 |
| 56 | 9 |
| 57 | 3 |

21. A rectangular playground is 80 meters long and 50 meters wide.

In your **Answer Document**, create and draw a scale model of the playground.

State the scale you used and label the dimensions of each side of your model. Show or explain how you determined the length of each side of your model.

For question 21, respond completely in your **Answer Document**. (4 points)

22. The graph shows times for runners in the 50-yard dash.

**50-Yard Dash**
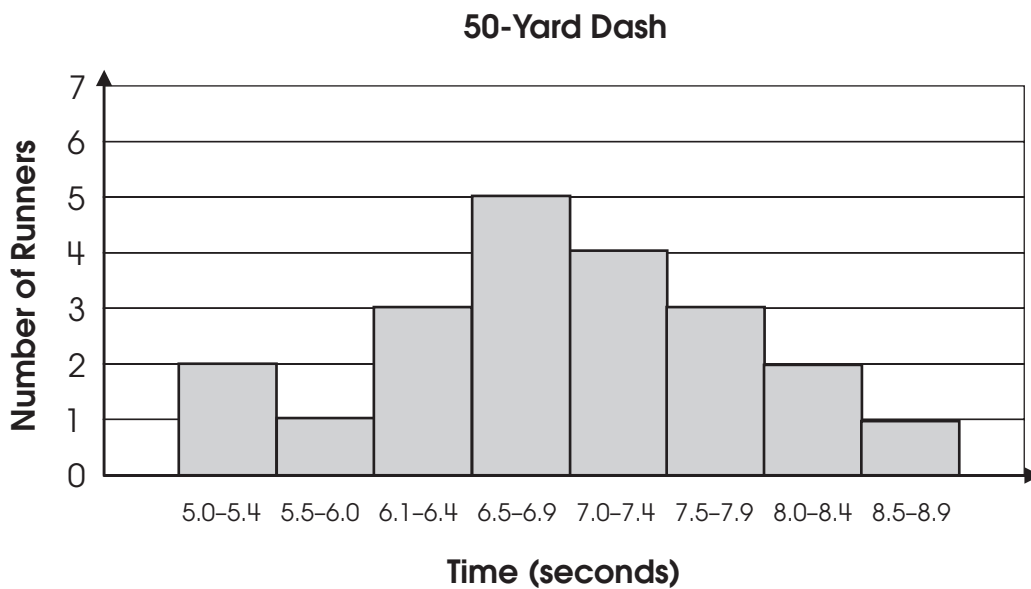


How many runners ran the distance in less than 7.0 seconds?

A. 4 runners

B. 5 runners

C. 11 runners

D. 21 runners

Go to next page ➡

23. Kristi is selling candy bars to raise money for her track team. Each of her neighbors bought 4 candy bars. She also sold 18 candy bars to her friends at school for a total of 38 candy bars. The equation $4x + 18 = 38$ represents this situation where $x$ is the number of neighbors.

    How many neighbors bought candy bars from Kristi?

    A. $x = 5$

    B. $x = 14$

    C. $x = 16$

    D. $x = 80$

24. What is the largest number that divides both 12 and 30 evenly?

    A. 2

    B. 3

    C. 6

    D. 12

25. The chart shows winning times for the women's 100-meter freestyle in every Olympic Games since 1960.

**Olympic Times for Women's 100-Meter Freestyle**

| Year | Swimmer (Country) | Time (seconds) |
|------|-------------------|----------------|
| 1960 | Dawn Fraser (Australia) | 61.20 |
| 1964 | Dawn Fraser (Australia) | 59.50 |
| 1968 | Jan Henne (USA) | 60.00 |
| 1972 | Sandra Neilson (USA) | 58.59 |
| 1976 | Kornelia Ender (Germany) | 55.65 |
| 1980 | Barbara Krause (Germany) | 54.79 |
| 1984 | Nancy Hogshead (USA) and Carrie Steinseifer (USA) | 55.92 |
| 1988 | Kristin Otto (Germany) | 54.93 |
| 1992 | Zhuang Yong (China) | 54.65 |
| 1996 | Le Jingyi (China) | 54.50 |
| 2000 | Inge de Bruijn (Netherlands) | 53.83 |
| 2004 | Jody Henry (Australia) | 53.84 |
| 2008 | | ? |

Which time is a reasonable prediction for the winning time in this race at the 2008 Olympic Games?

A. 60.50 seconds

B. 58.50 seconds

C. 53.50 seconds

D. 48.50 seconds

26. Buses to the stadium leave Central Station every 10 minutes. Buses to the zoo leave Central Station every 16 minutes. Both buses leave Central Station at 4 p.m.

    In your **Answer Document**, find the next time both buses will leave Central Station at the same time. Show or explain how you found your answer.

For question 26, respond completely in your **Answer Document**. (2 points)

27. Which figure represents a perpendicular intersection of two planes?

A.

B.

C.

D.

Go to next page
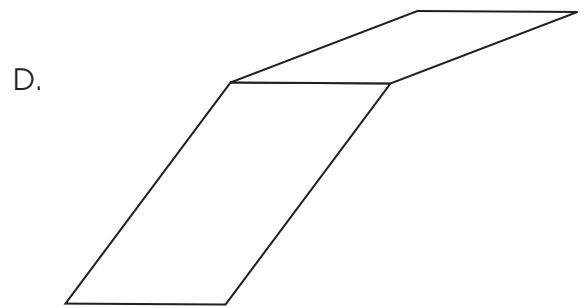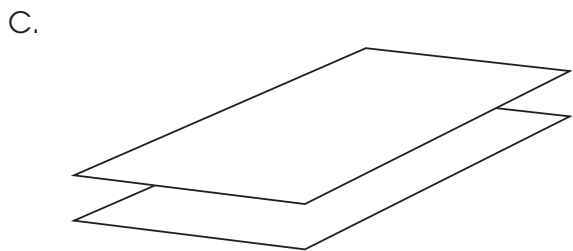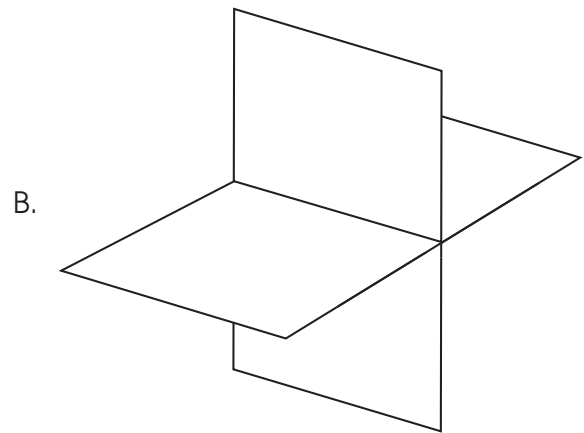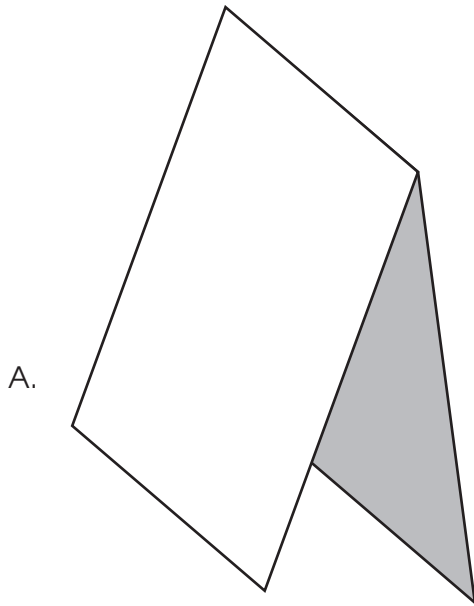
28. The table shows Jim's savings over time.

**Jim's Savings**

| Week | Savings |
|------|---------|
| 1 | $45 |
| 2 | $70 |
| 3 | $95 |
| 4 | $120 |

Which describes the rate of change of Jim's savings over time?

A. constant rate of decrease

B. constant rate of increase

C. varying rate of decrease

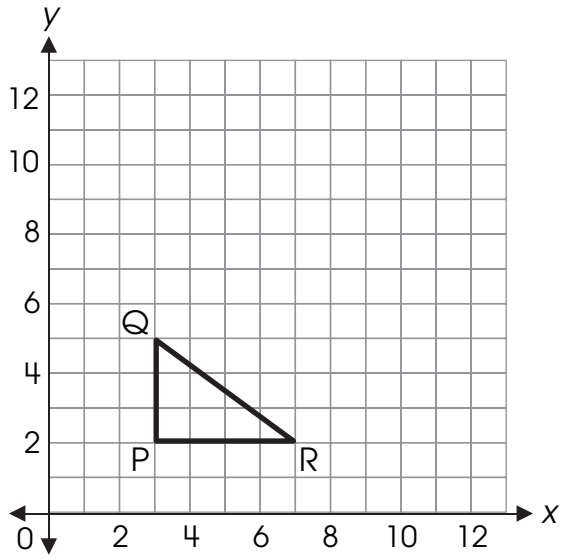D. varying rate of increase

29. Which number is equivalent to

$8^2 \times (1\frac{1}{2} + \frac{1}{2})$?
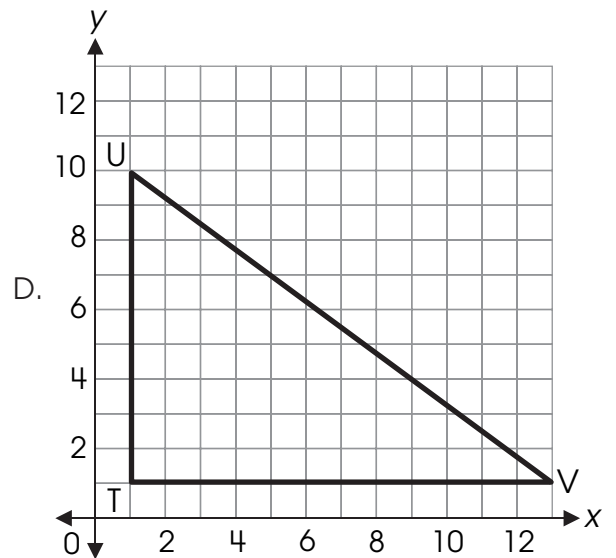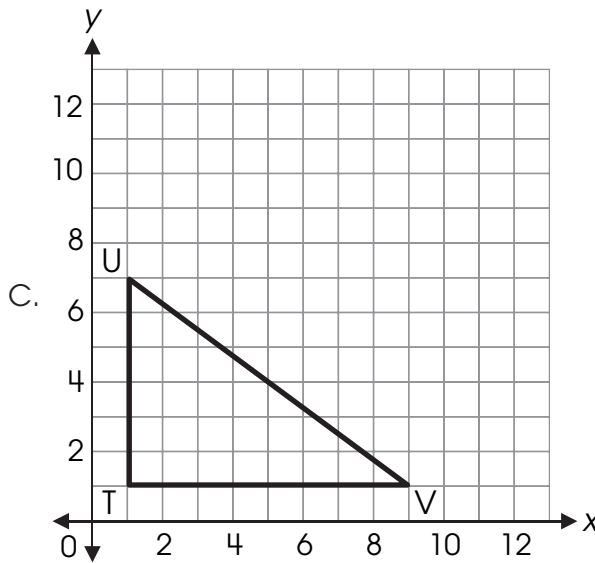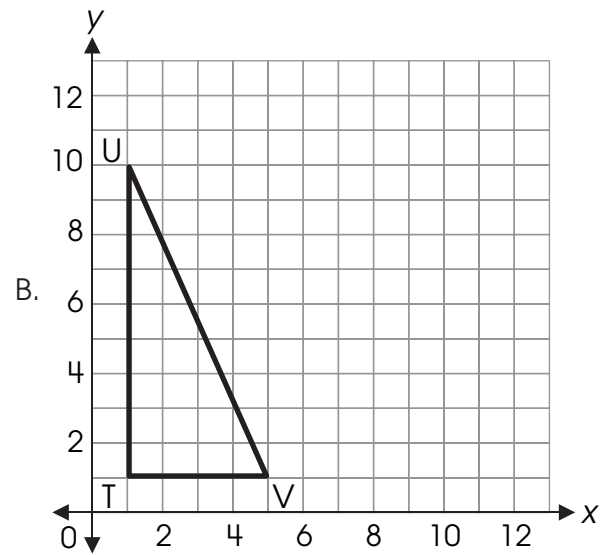
A. $24\frac{1}{2}$

B. 32

C. $96\frac{1}{2}$

D. 128

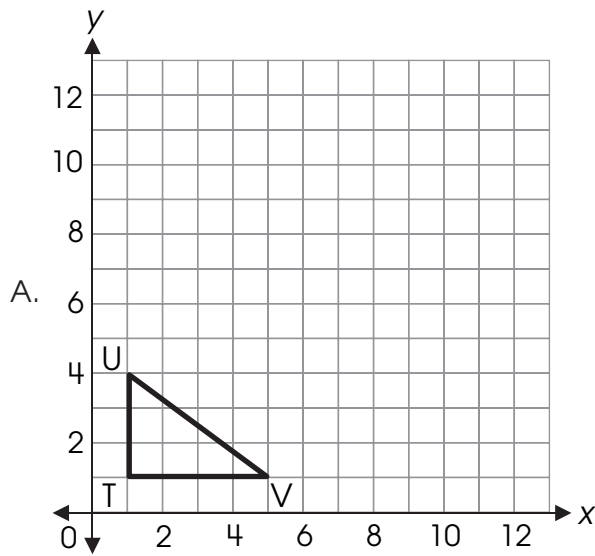30.  Triangle PQR is shown.

Which graph shows a figure similar to triangle PQR by a ratio of 1 to 3?



A.

B.

C.

D.

31. Marla and her cousins invented a game. Marla used chalk to draw a rectangle that was 15 feet wide and 25 feet long for a space to play her game.

    Several other children joined in, and Marla realized that the rectangle was now too small. She doubled the length and doubled the width to create a new play area.

    In your **Answer Document**, compare the perimeters of the original play space and the new play space. Determine how much greater the new perimeter is than the original perimeter. Show or explain your work.

    Then, compare the areas of the original and the new play spaces. Determine how much greater the new area is than the original area. Show or explain your work.

    For question 31, respond completely in your **Answer Document**. (4 points)

32. Which estimate is reasonable for how many $4\frac{7}{8}$ -inch-long pieces of ribbon can be cut from a 20-inch-long piece of ribbon?

    A.  2

    B.  4

    C.  5

    D.  15

33. Eighty students voted in the election for the sixth-grade class president. The results are shown in the graph.

**Election Results**
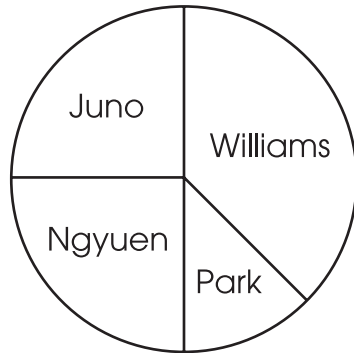


About how many votes did Park receive?

A.   4

B.   10

C.   20

D.   40

34. A DVD collection contains 8 dramas, 12 comedies and 6 action movies.

What is the ratio of dramas to action movies?

A.   2:3

B.   3:4

C.   4:3

D.   3:2

Go to next page

35. The Drama Club needed to earn enough money to pay for the costs of putting on a play. Club members had a goal of $300. They raised $450.

Which picture shows the percentage of the goal they met?

A.
200%
100%
0%

B.
200%
100%
0%

C.
200%
100%
0%

D.
200%
100%
0%

Go to next page
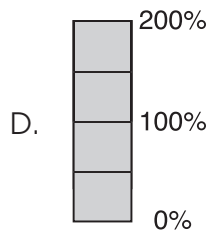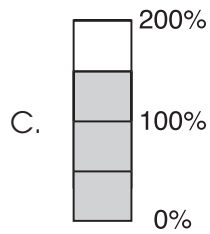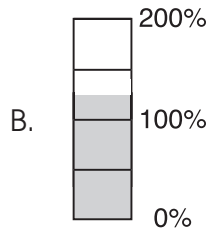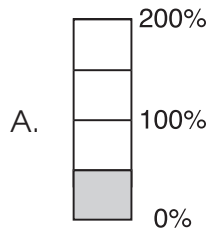
36. The table shows the lunch choices of 155 students.

**Meadowlake School Lunch Sales**

| Taco | Pizza | Peanut Butter and Jelly | Salad | Total |
|------|-------|-------------------------|-------|-------|
| 43 | 48 | 38 | 26 | 155 |

A circle graph and a bar graph are constructed to represent these data.

**Meadowlake School Lunch Sales**



**Meadowlake School Lunch Sales**
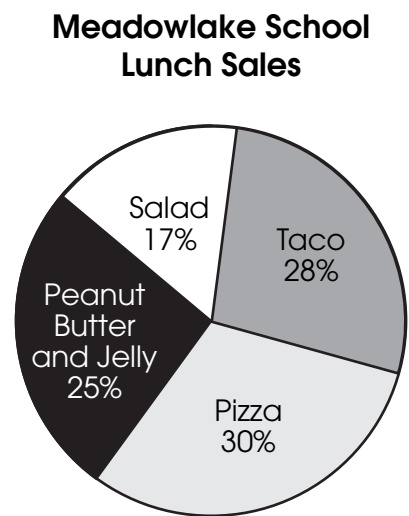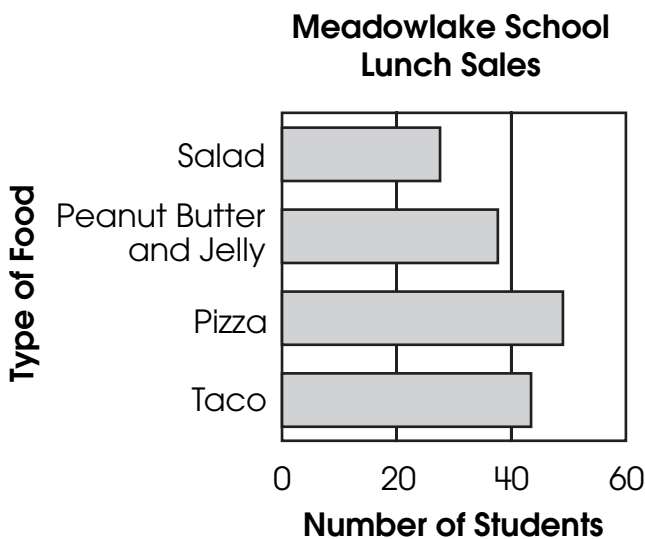


In your **Answer Document**, give one advantage of using the bar graph to display these data. Then give one advantage of using the circle graph to display these data.

For question 36, respond completely in your **Answer Document**. (2 points)

37. The model represents the quotient of two fractions.



$$\frac{3}{4} \qquad \frac{3}{4} \qquad \frac{3}{4}$$
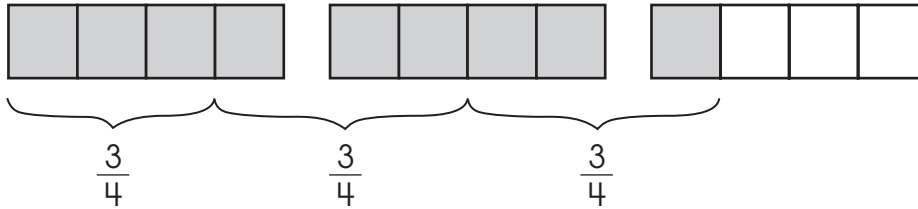
Which expression does this model represent?

A. $\frac{3}{4} \div 2\frac{1}{4}$

B. $2\frac{1}{4} \div \frac{1}{4}$

C. $2\frac{1}{4} \div \frac{4}{3}$

D. $2\frac{1}{4} \div \frac{3}{4}$

38. At the school carnival, Annika's class earned $120 in 1 hour and 30 minutes.

At this rate, how much will they earn during the 6 hours the carnival is open?

A. $ 480

B. $ 720

C. $ 840

D. $1,470

39. Shawna has 36 Ping-Pong balls in a shoebox. She has 8 white balls, 12 orange balls and 16 green balls. She predicts that when she reaches into the box without looking, she will pull out an orange ball $\frac{1}{3}$ of the time.

   Which activity would best allow Shawna to test her prediction?

   A. Measure the circumference of the Ping-Pong balls.

   B. Randomly select a Ping-Pong ball and replace it. Repeat 100 times and see how close to 33 times the orange ball is selected.

   C. Ask three different people to predict what color they think will be selected.

   D. Randomly select a Ping-Pong ball and replace it. Repeat three times to see whether each color is chosen.

40. The triangular street sign shown has a base 30 inches long and a height of 26 inches.
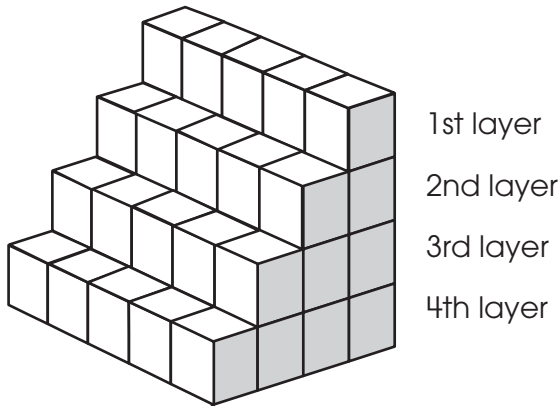
   30 in.

   26 in.
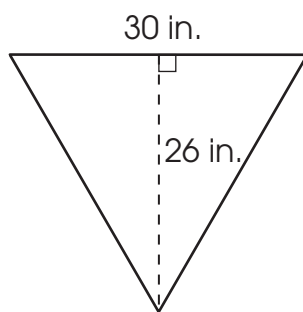
   Which estimate of the area of the street sign is reasonable?

   A. about 60 square inches

   B. about 250 square inches

   C. about 400 square inches

   D. about 750 square inches

41. The top 4 layers of a 10-layer staircase are shown.



1st layer

2nd layer

3rd layer

4th layer

For question 41, respond completely in your **Answer Document**. (2 points)

In your **Answer Document**, tell how many blocks are in the 10th layer of the staircase if the pattern continues. Show or explain how you found your answer.

42. The square and the rectangle have the dimensions shown.

8 cm

8 cm

12 cm

4 cm
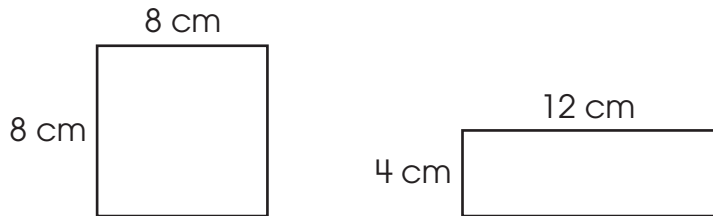
What description is true about the figures?

A. same area, same perimeter

B. same area, different perimeter

C. different area, same perimeter

D. different area, different perimeter

43. Solve for $x$:      $2x + 5 < 17$

A. $x > 6$

B. $x < 6$

C. $x > 10$

D. $x < 10$

Go to next page

44. Which expression is equivalent to
    $(4 \times 3) + (4 \times 8)$?

    A. $16 \times 8$

    B. $4 \times (3 \times 8)$

    C. $4 \times (3 + 8)$

    D. $4 \times 35$

45. The graph shows the total enrollment at a
    middle school over a 10-year period.

    **Student Enrollment**
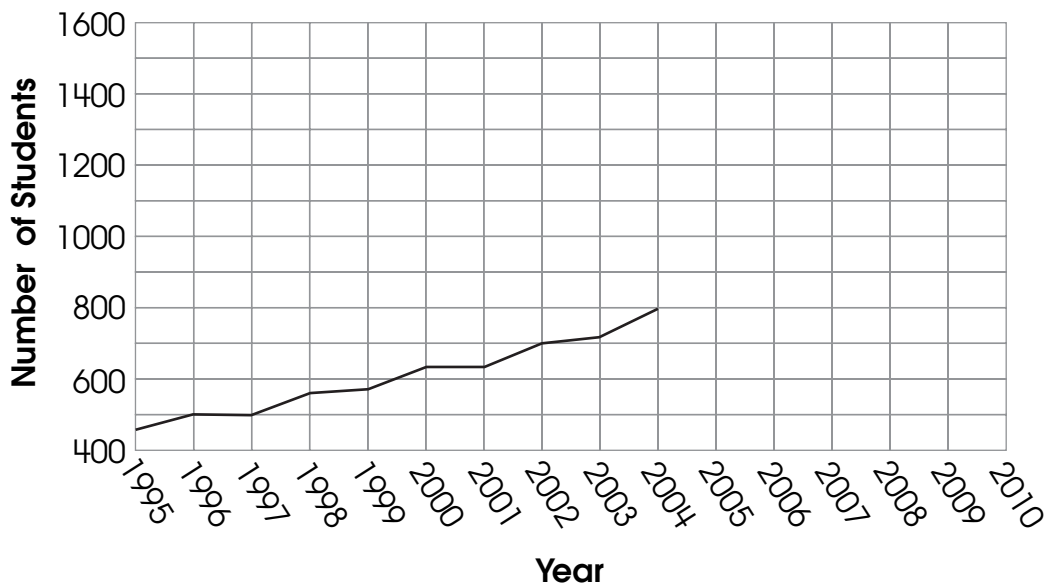
    

    Which is a reasonable prediction for the total
    enrollment at the school in 2010?

    A.   400

    B.   700

    C. 1,000

    D. 1,600

STOP

# Grade 6 Mathematics
## Answer Key
## March 2006

| Item No. | Type | Content Standard | Content Standard Benchmark | Answer Key |
|---|---|---|---|---|
| 1 | Multiple Choice | Number, Number Sense and Operations | H | A |
| 2 | Multiple Choice | Measurement | E | C |
| 3 | Multiple Choice | Geometry and Spatial Sense | D | B |
| 4 | Multiple Choice | Number, Number Sense and Operations | E | D |
| 5 | Multiple Choice | Measurement | C | D |
| 6 | Short Answer | Patterns, Functions and Algebra | E | 2 pt rubric |
| 7 | Multiple Choice | Patterns, Functions and Algebra | D | C |
| 8 | Multiple Choice | Geometry and Spatial Sense | I | D |
| 9 | Multiple Choice | Data Analysis and Probability | D | C |
| 10 – 15 | | **Field test questions not used in student score** | | |
| 16 | Short Answer | Number, Number Sense and Operations | I | 2 pt rubric |
| 17 | Multiple Choice | Data Analysis and Probability | F | C |
| 18 | Multiple Choice | Geometry and Spatial Sense | D | A |
| 19 | Multiple Choice | Patterns, Functions and Algebra | G | D |
| 20 | Multiple Choice | Patterns, Functions and Algebra | M | C |
| 21 | Extended Response | Geometry and Spatial Sense | F | 4 pt rubric |
| 22 | Multiple Choice | Data Analysis and Probability | A | C |
| 23 | Multiple Choice | Patterns, Functions and Algebra | H | A |
| 24 | Multiple Choice | Number, Number Sense and Operations | G | C |
| 25 | Multiple Choice | Data Analysis and Probability | G | C |
| 26 | Short Answer | Number, Number Sense and Operations | G | 2 pt rubric |
| 27 | Multiple Choice | Geometry and Spatial Sense | D | B |
| 28 | Multiple Choice | Patterns, Functions and Algebra | M | B |
| 29 | Multiple Choice | Number, Number Sense and Operations | E | D |
| 30 | Multiple Choice | Geometry and Spatial Sense | F | D |
| 31 | Extended Response | Measurement | F | 4 pt rubric |
| 32 | Multiple Choice | Number, Number Sense and Operations | I | B |
| 33 | Multiple Choice | Data Analysis and Probability | A | B |
| 34 | Multiple Choice | Number, Number Sense and Operations | D | C |
| 35 | Multiple Choice | Number, Number Sense and Operations | C | C |
| 36 | Short Answer | Data Analysis and Probability | D | 2 pt rubric |
| 37 | Multiple Choice | Number, Number Sense and Operations | H | D |
| 38 | Multiple Choice | Number, Number Sense and Operations | I | A |
| 39 | Multiple Choice | Data Analysis and Probability | K | B |
| 40 | Multiple Choice | Measurement | C | C |
| 41 | Short Answer | Patterns, Functions and Algebra | E | 2 pt rubric |
| 42 | Multiple Choice | Measurement | G | C |
| 43 | Multiple Choice | Patterns, Functions and Algebra | H | B |
| 44 | Multiple Choice | Patterns, Functions and Algebra | D | C |
| 45 | Multiple Choice | Data Analysis and Probability | B;G | C |

Limited = 0-13; Basic = 14-19; Proficient = 20-28; Accelerated = 29-37; Advanced = 38-50
Multiple Choice = 1 point; Short Answer = 2 points; Extended Response = 4 points