

Student Name: \_\_\_\_\_

# Ohio Achievement Tests



## Mathematics Student Test Booklet May 2009

*This test was originally administered to students in May 2009.*

*Not all items from the May 2009 administration will be released in this document. According to Ohio Revised Code (ORC) 3301.07.11:4(b) . . . not less than forty percent of the questions on the test that are used to compute a student's score shall be a public record. The department (of education) shall determine which questions will be needed for reuse on a future test and those questions shall not be public records and shall be redacted from the test prior to its release as public record.*

*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. What is the value of  $2^0 + 2^{-1} + 2^{-2}$ ?

- A.  $-6$
- B.  $2^{-3}$
- C.  $1\frac{3}{4}$
- D.  $7$

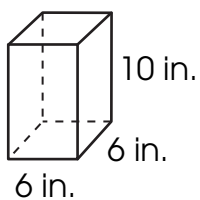
Items 2–3 have not been slated for public release  
in 2009.



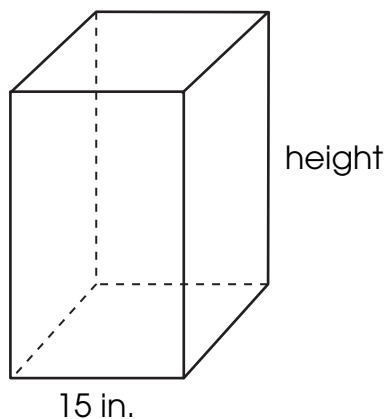
4. Which is the value of  $x$  when  $6x + 12 > 0$ ?

- A.  $x < -2$
- B.  $x < 2$
- C.  $x > 2$
- D.  $x > -2$

5. The two boxes shown are similar rectangular prisms.



**Box A**



**Box B**

What is the height of box B?

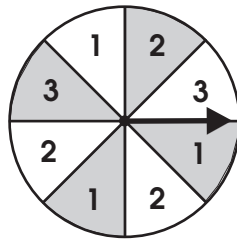
- A. 19 inches
- B. 25 inches
- C. 30 inches
- D. 37.5 inches

6. The square root of a number is 15.

In your **Answer Document**, determine the value of the number. Explain your reasoning.

For question 6, respond completely in your **Answer Document**. (2 points)

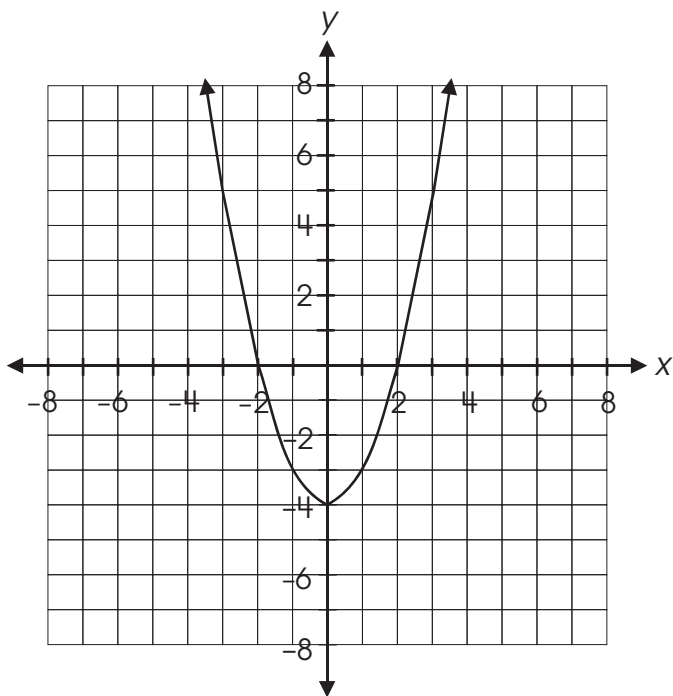
7. The spinner shown is used in a game.



Which prediction is accurate?

- A. When the spinner is spun 100 times, it will land on a two about the same number of times that it will land on a three.
- B. When the spinner is spun 1,000 times, it will land on a three about 250 times.
- C. When the spinner is spun once, it is more likely that the spinner will land on a two than on a one.
- D. When the spinner is spun 300 times, there will be about the same number of ones, twos and threes spun.

8. The graph of  $y = x^2 - 4$  is shown.



Which are the solutions to  $x^2 - 4 = 0$  ?

- A.  $x = -4$  and  $x = 4$
- B.  $x = -2$  and  $x = 2$
- C.  $x = 0$  and  $x = -4$
- D.  $x = 4$  and  $x = 2$

Item 9 has not been slated for public release in 2009.

10. Which subset of the real numbers contains  $\frac{3}{4}$ ?

- A. integers
- B. natural numbers
- C. rational numbers
- D. irrational numbers

Item 11 has not been slated for public release in 2009.



12. Use substitution to find the solution for the system of equations.

$$y = -2x + 3$$

$$y = -3$$

Which is the solution for this system?

- A.  $(-3, -3)$
- B.  $(9, -3)$
- C.  $(0, -3)$
- D.  $(3, -3)$

Items 13–15 have not been slated for public release  
in 2009.



16. The fastest kind of train in the world, a Maglev train, carries passengers 30 kilometers in just 8 minutes.

In California, transportation officials want to build a Maglev train to take passengers from San Francisco to Los Angeles, a distance of 340 miles. Currently, this trip takes approximately 6 hours by car. The train will be built only if it will reduce travel time from San Francisco to Los Angeles by 50% or more.

In your **Answer Document**, explain why a Maglev train should be built from San Francisco to Los Angeles. Use mathematical reasoning to support your statement, including all calculations.

(1 kilometer = 0.62 mile)

For question 16, respond completely in your **Answer Document**. (4 points)

On the May 2009 Grade 8 Mathematics Achievement Test, items 17–22 are field-test items, which are not released.

Items 23–24 have not been slated for public release in 2009.





25. A coin is tossed two times.

What is the probability that the coin will land heads up both times?

A. 0

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

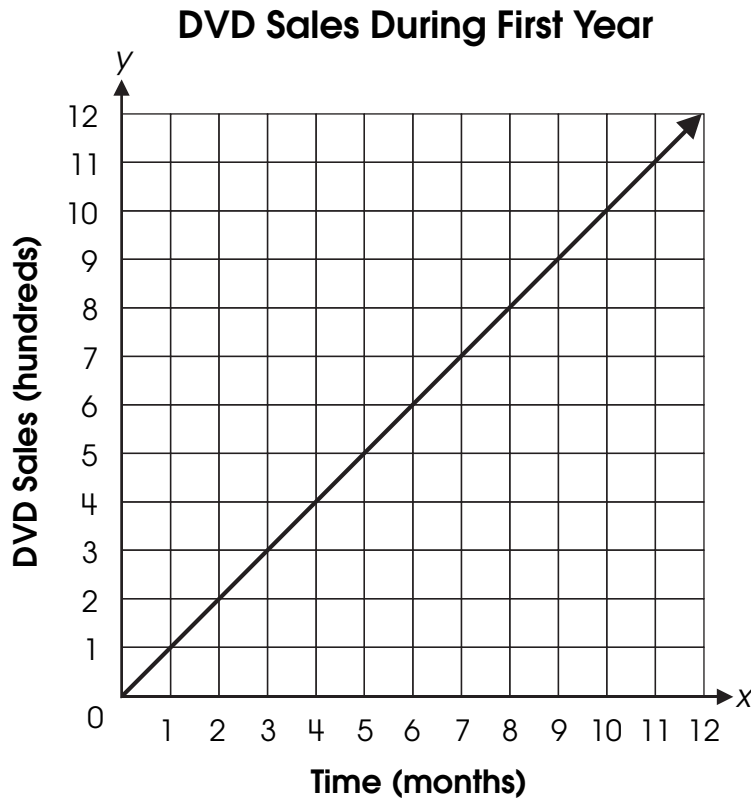
C.  $\frac{1}{2}$

D. 1



26. The rate at which a store's DVD sales are growing in the first year is represented by the equation  $y = x$ , where  $x$  is the number of months and  $y$  is the DVD sales, as shown on the graph.

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



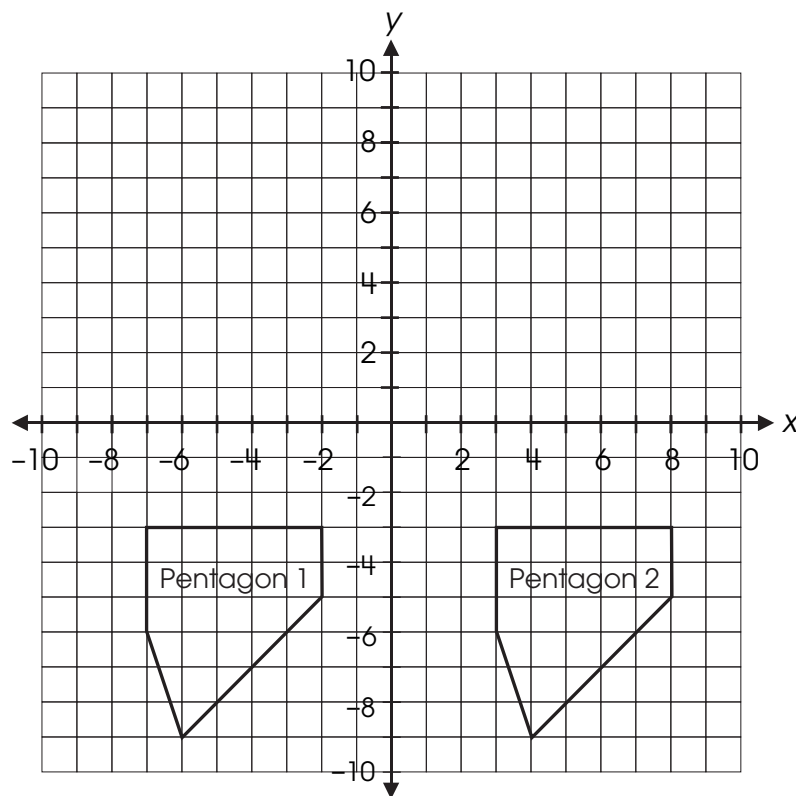
The company's goal is to have next year's DVD sales represented by the equation  $y = 2x$ .

In your **Answer Document**, describe how the DVD sales would have to change for this company to meet its goal and describe how the graph would change.

27. What is 0.0000832 written in scientific notation?

- A.  $0.832 \times 10^{-4}$
- B.  $8.32 \times 10^{-5}$
- C.  $83.2 \times 10^{-6}$
- D.  $832 \times 10^{-7}$

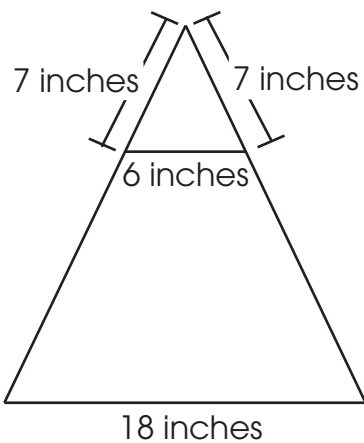
28. A transformation of pentagon 1 resulted in pentagon 2.



Which transformation was used?

- A. a reflection across the  $y$ -axis
- B. a translation 10 units to the right
- C. a translation 5 units to the right
- D. a reflection across the  $x$ -axis

29. A small triangle and a larger triangle are shown.

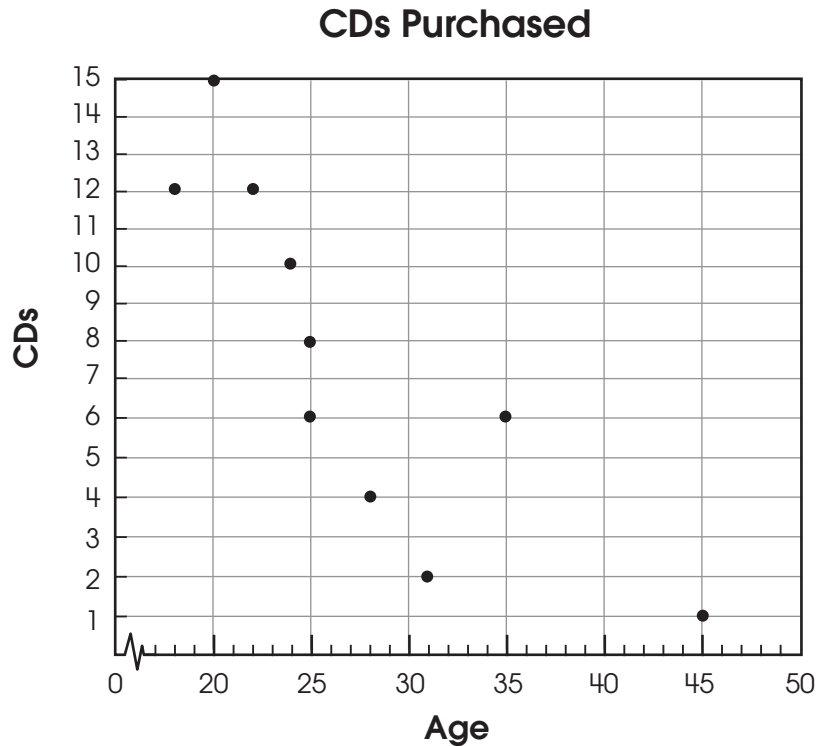


The two triangles are similar.

What is the perimeter of the larger triangle?

- A. 38 inches
- B. 46 inches
- C. 54 inches
- D. 60 inches

30. Ten people of various ages were asked to estimate the number of CDs they had purchased in the past year. The results are shown in the scatter plot.



Which statement is supported by the data in the scatter plot?

- A. As age increases, the number of CDs purchased in a year tends to increase.
- B. As age increases, the number of CDs purchased in a year tends to decrease.
- C. There is no relationship between age and the number of CDs purchased in a year.
- D. As age increases, the number of CDs purchased in a year tends to stay the same.

Item 31 has not been slated for public release in 2009.

32. Thirty-five out of thirty-eight students take the bus to school each day.

Which is the best estimate for the percent of these students who take the bus to school?

- A. 10%
- B. 50%
- C. 70%
- D. 90%



33. The Culinary Café has a sandwich and drink combo meal. A customer may choose one type of meat and one type of bread for the sandwich. There are six different meats, three different breads and five different drinks.

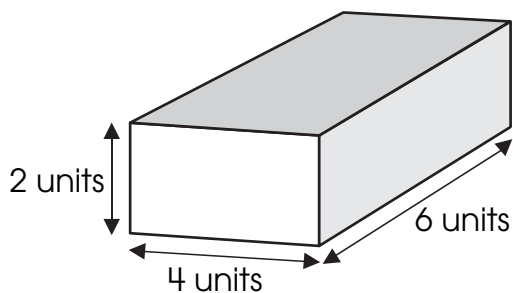
How many different meals are there?

- A. 14
- B. 18
- C. 30
- D. 90



Items 34–35 have not been slated for public release in 2009.

36. A rectangular prism is shown.



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

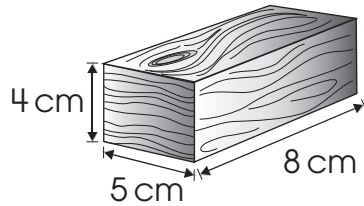
In your **Answer Document**, sketch a net for the prism. Label each side with correct dimensions.

Items 37–39 have not been slated for public release in 2009.



40. The density of an object can be determined using the formula  $\text{Density} = \frac{\text{Mass}}{\text{Volume}}$ .

The piece of wood shown has a mass of 16 grams.



What is the density of the piece of wood?

- A.  $0.1 \text{ g/cm}^3$
- B.  $0.9 \text{ g/cm}^3$
- C.  $10.0 \text{ g/cm}^3$
- D.  $11.5 \text{ g/cm}^3$

Items 41–44 have not been slated for public release in 2009.