Student Name: _____

Ohio's Achievement Tests

Mathematics

March 2005

This test was originally administered to students in March 2005. 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.

7/05

Copyright © 2005 by Ohio Department of Education. All rights reserved.

The Ohio Department of Education does not discriminate on the basis of race, color, national origin, sex, religion, age, or disability in employment or the provision of services.

Directions:

Today you will be taking the Ohio Grade 8 Mathematics Achievement Test. Three different kinds of questions appear on this test: multiple choice, short answer and extended response.

There are several important things to remember:

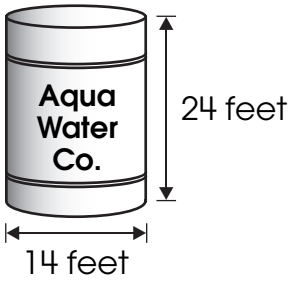
- Read each question carefully. Think about what is being asked. Look carefully at graphs or diagrams because they will help you understand the question.
- You may use the blank areas of your test booklet to solve problems.
- For short-answer and extended-response questions, write your answers neatly and clearly in the space provided in the answer document. Any answers you write in the test booklet will not be scored.
- Short-answer questions are worth two points. Extended-response questions are worth four points. Point values are printed near each question in your test booklet. The amount of space provided for your answer is the same for two- and four-point questions.
- For multiple-choice questions, shade in the circle next to your choice in the answer document for the test question. Mark only one choice for each question. Darken completely the circles on the answer document. If you change an answer, make sure that you erase your old answer completely.
- Do not spend too much time on one question. Go on to the next question and return to the question skipped after answering the remaining questions.
- Check over your work when you are finished.

1. A company's profit of $\$1.71 \times 10^6$ will be shared equally by its 3,800 employees.

   How much money will each employee receive?

   A. $\$4.5 \times 10^1$
   B. $\$4.5 \times 10^2$
   C. $\$4.5 \times 10^3$
   D. $\$4.5 \times 10^5$

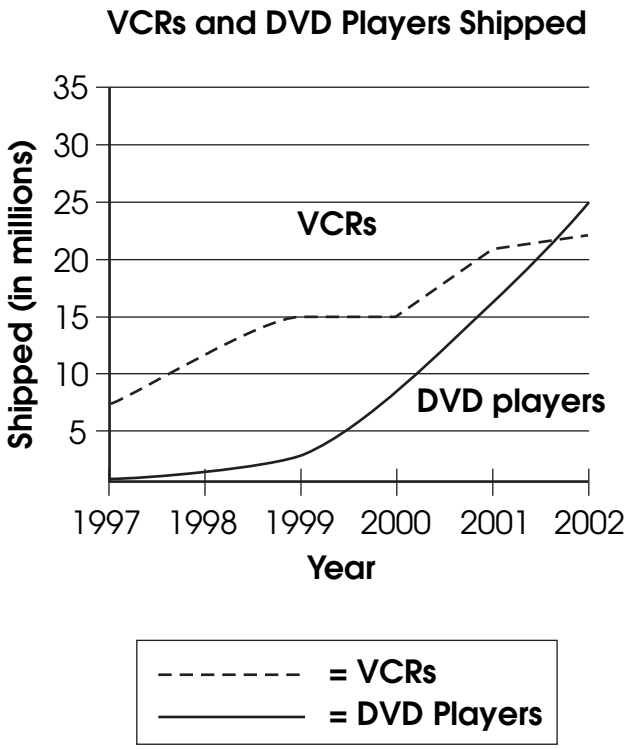
2. Aqua Water Company purchased a new water tank. The tank is a cylinder with a diameter of 14 feet and a height of 24 feet.



   What is the volume of the tank in cubic feet?

   A. 168π cubic feet
   B. 336π cubic feet
   C. $1{,}176\pi$ cubic feet
   D. $4{,}704\pi$ cubic feet

3. The graph shows the number of VCRs and DVD players shipped to distributors in North America from 1997 to 2002.



In what year did the number of DVD players shipped first exceed 10 million?

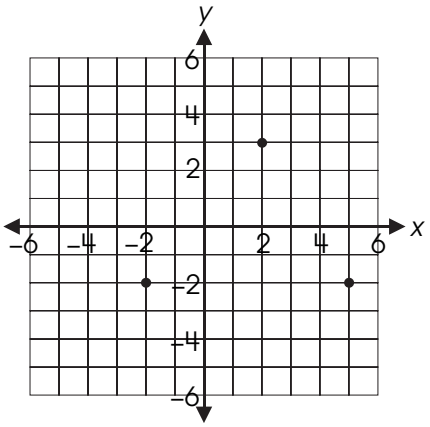
A. 1997

B. 1999

C. 2000

D. 2002

4. Three vertices of a trapezoid are located at points (2, 3), (–2, –2) and (5, –2).



Which point could represent the fourth vertex of the figure?

A. (5, 0)

B. (5, 4)

C. (–1, 3)

D. (–1, 5)

5. The formula used for converting the temperature from Fahrenheit (F) to Celsius (C) is $°C = \frac{5}{9}(°F - 32)$.

The outside temperature is 80°F.

About what is this temperature in degrees Celsius?

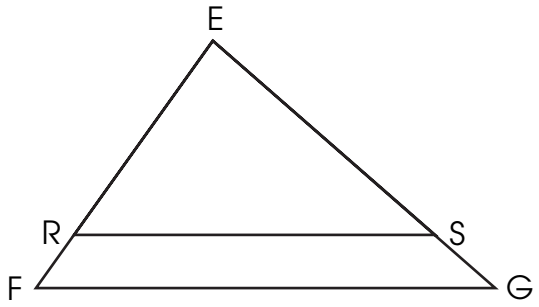
A. 27°C

B. 45°C

C. 80°C

D. 140°C

6. Jason constructed the figure shown.



He knows ΔERS is similar to ΔEFG and that $\overline{RS} \parallel \overline{FG}$.

Jason claims $\angle ERS \cong \angle EFG$.

In your **Answer Document**, identify two geometric properties that can be used to justify Jason's claim.

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

7. Sarah has five hats of different colors: red, blue, green, yellow, and orange.

How many different ways can Sarah arrange these hats next to each other on a shelf?

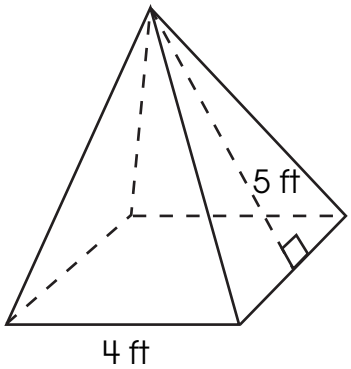
A. 5

B. 10

C. 25

D. 120

8. Marco is building a model of a square pyramid.



He wants to cover the entire model, including the base, with gray paper.

How many square feet of paper will he need to cover the model?

A. 40 square feet

B. 46 square feet

C. 56 square feet

D. 96 square feet

9. The table shows the relationship between the number of doughnuts (d), and the total cost (c) in dollars for an order of doughnuts.

Number of Doughnuts (d)	Total Cost (c) (in dollars)
1	0.40
2	0.65
3	0.90
4	1.15
5	1.40
6	1.65
7	1.90

Which equation shows the total cost for an order of doughnuts?

A. $c = 0.15d + .25$

B. $c = 0.25d + .15$

C. $c = 0.28d$

D. $c = 0.40d$

10. Which is the value of x when $\frac{x}{3} + 5 = 15$?

A. $x = 30$

B. $x = 40$

C. $x = 50$

D. $x = 60$

11. Will plans to buy at least 10, and possibly more, new CDs and is trying to decide between two different CD offers.

CD-Land charges $40 to become a member of a frequent buyers club and $9 for each CD you buy.

MUSICVILLE has no membership fee and charges $12 for each CD you buy.

In your **Answer Document**, create and label a double line graph that shows the cost of 1 to 20 CDs for each of the two offers. Explain how Will can use this graph to decide which offer to accept.

For question 11, respond completely in your **Answer Document**. (2 points)

12. A store sold 28 boxes of juice from a case containing 48 boxes.

Approximately what percent of the case of juice has been sold?

A. 20%

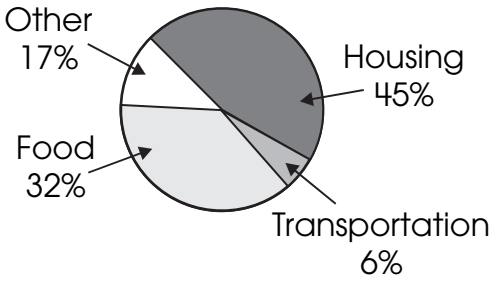
B. 30%

C. 40%

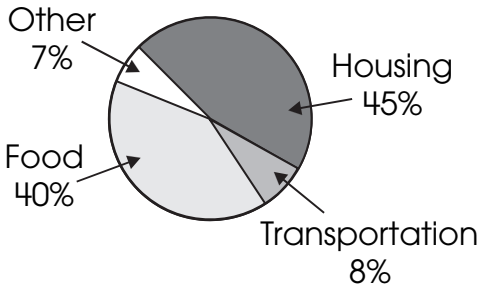
D. 60%

13. The Hernandez family has a monthly income of $4,500. The Thomas family has a monthly income of $3,200. The two circle graphs show the monthly budgets of two families.

Hernandez Family
($4,500)



Thomas Family
($3,200)



Which statement is supported by the data in the two graphs?

A. The Thomas family spends more dollars each month on transportation than the Hernandez family does.

B. The Hernandez family spends more dollars each month on food than the Thomas family does.

C. Both families spend more dollars on "other" than on transportation.

D. Both families spend the same amount of dollars each month on housing.

14. Which subset of the real numbers contains $\sqrt{5}$?

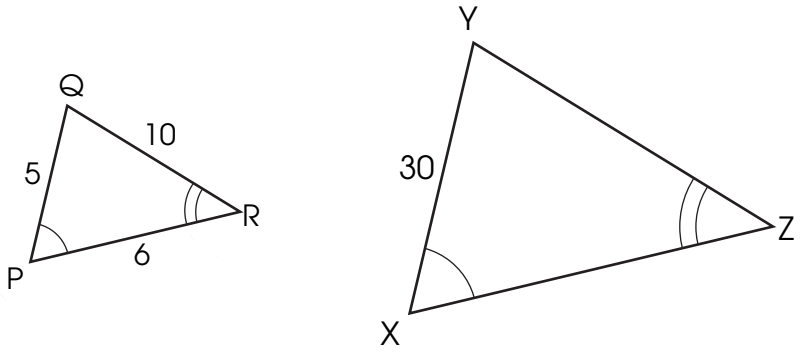
A. integers

B. whole numbers

C. rational numbers

D. irrational numbers

15. ΔPQR is similar to ΔXYZ.



What is the perimeter of ΔXYZ?

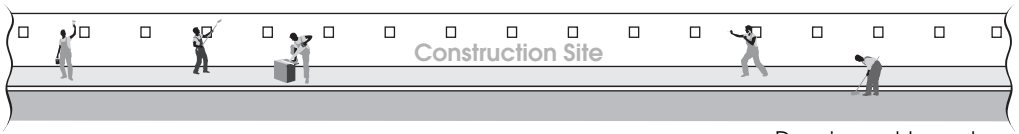
A. 21 cm

B. 63 cm

C. 105 cm

D. 126 cm

16. A wooden fence was built around a construction site. The wall is 600 feet long and 8 feet high. Each 12-foot length of the fence has a 2-foot by 2-foot window cut into the wall so people can watch the construction.



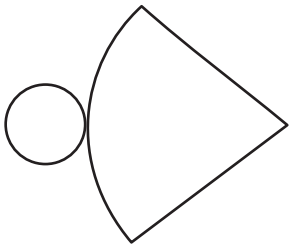
Drawing not to scale

The city council asked the construction company to paint the side of the fence facing the street. A gallon of paint will cover approximately 250 square feet.

In your **Answer Document**, determine how many gallons of paint are needed to paint one side of the fence. Show your work to support your answer.

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

17. Ray found the paper cut-out shown.



Which 3-dimensional object is formed when the cut-out is assembled?

A. cone

B. cylinder

C. prism

D. sphere

18. In a number game, Rick was supposed to find the square root of a number. Instead, he squared the number and said "16."

What number should Rick have given?

A. 2

B. 4

C. 8

D. 16

On the March 2005 Grade 8 Mathematics Achievement Test, items 19–24 are field-test items, which are not released.

25. Each student brought 3, 4 or 5 pieces of candy to class. There are 17 students in the class.

Which number is **NOT** a reasonable total for the number of pieces of candy the students brought?

A. 45

B. 55

C. 65

D. 75

26. There are 8 homes for sale near Bell Middle School. The chart below shows the square footage and cost of each house.

Square Feet	Cost
1400	$95,000
4275	$350,000
2100	$239,000
1850	$139,000
2550	$259,000
3100	$299,000
1900	$189,000
2200	$160,000

In your **Answer Document**, create a scatter plot that represents the data in the chart. Be sure to label your axes and create appropriate scales.

Use the scatter plot to explain the relationship that exists between the number of square feet and the cost of the 8 houses.

Use the data to predict the approximate cost of a house that has 6,000 square feet. Use mathematics to explain or support your prediction.

For question 26, respond completely in your **Answer Document**. (4 points)

27. Which integer is a perfect square?

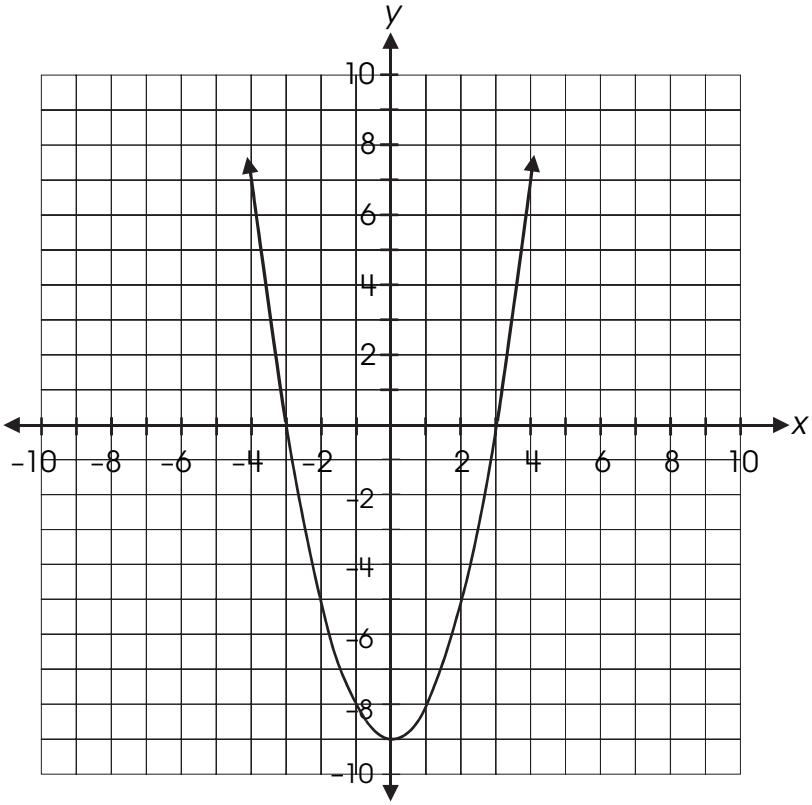
A. 125

B. 200

C. 225

D. 300

28. The graph of $y = x^2 - 9$ is shown.



For what values of x does $x^2 - 9 = 0$?

A. $x = 2$ and $x = -2$

B. $x = 3$ and $x = -3$

C. $x = 4.5$ and $x = 0$

D. $x = -9$ and $x = 0$

29. Dave wants to estimate the distance from Harrisburg to Jonestown. The distance on the map is about 13 inches. The scale on the map indicates that 2.5 inches = 6 miles.

About how many miles is it from Harrisburg to Jonestown?

A. 5 miles

B. 15 miles

C. 31 miles

D. 39 miles

30. Circle *A* has a radius that is twice the length of the radius of Circle *B*.

Which is an accurate statement about the relationship of the areas of Circles *A* and *B*?

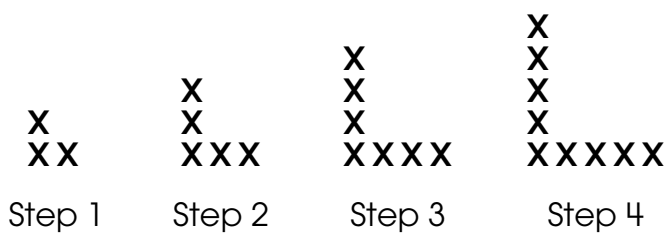
A. The area of Circle *A* is four times the area of Circle *B*.

B. The area of Circle *A* is twice the area of Circle *B*.

C. The area of Circle *A* is one-half the area of Circle *B*.

D. The area of Circle *A* is one-fourth the area of Circle *B*.

31. The first four steps in a pattern are shown:



In your **Answer Document**, write an equation or a rule that can be used to find the number of **x**'s in any step of the pattern. Use your equation or rule to find the number of the **x**'s for step 50.

For question 31, respond completely in your **Answer Document**. (2 points)

32. A bag contains 4 sour-apple candies and 3 watermelon candies. One piece of candy is chosen at random and returned to the bag. Then a second piece of candy is chosen at random.

What is the probability that both pieces of candy chosen will be sour-apple?

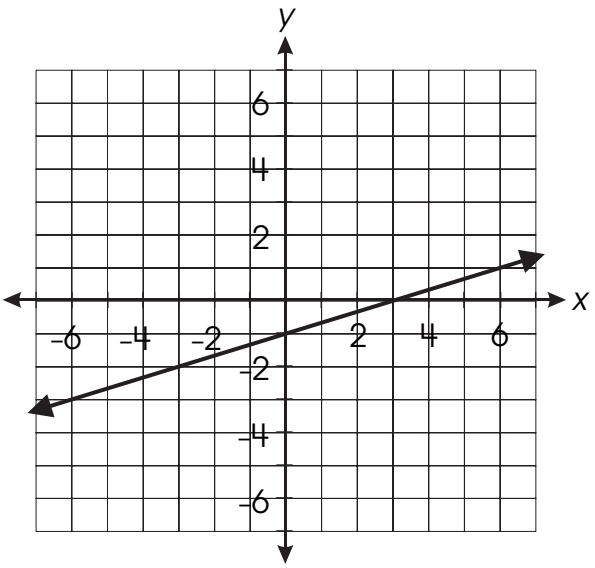
A. $\frac{1}{16}$

B. $\frac{12}{49}$

C. $\frac{16}{49}$

D. $\frac{8}{7}$

33. The graph of an equation is shown on the coordinate plane.



Which table of values represents coordinate points that lie on the line?

A.

x	y
–3	–2
0	–1
3	0
6	1

B.

x	y
–2	–3
–1	0
0	3
1	6

C.

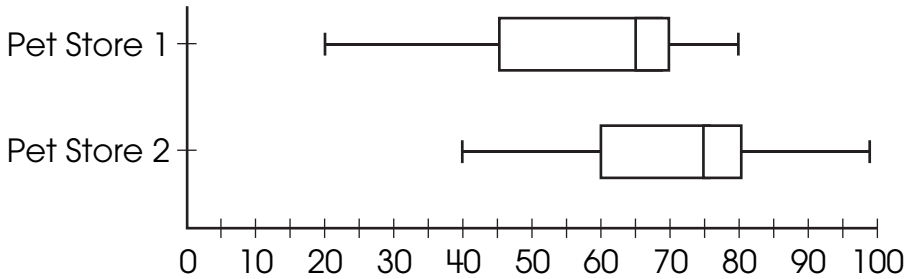
x	y
3	–2
0	–1
–3	0
–6	1

D.

x	y
–2	3
–1	0
0	–3
1	–6

34. The box-and-whisker plots show the distribution of weight among dogs in two different pet stores.

Weight of Dogs



Dogs' Weight (lb)

How much greater is the median weight of the dogs in Pet Store 2 than in Pet Store 1?

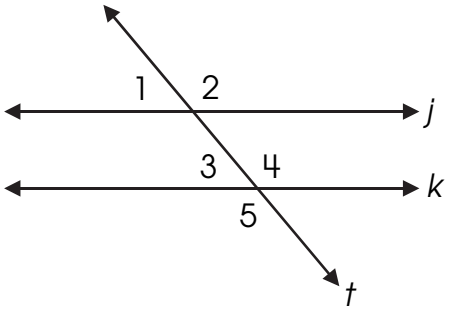
A. 5

B. 10

C. 15

D. 20

35. In the figure, lines *j* and *k* are parallel.



Which angle is congruent to ∠1?

A. ∠2

B. ∠3

C. ∠4

D. ∠5

36. Cheryl is a member of the basketball team. She made 44 out of 50 foul shots last year. Cheryl has made 18 out of 20 foul shots so far this year.

In your **Answer Document**, write what Cheryl could say to convince her coach that she is shooting foul shots better this year. Use the data to support your answer.

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

37. A light year is defined as approximately 5,880,000,000,000 miles.

Which distance is the same as a light year?

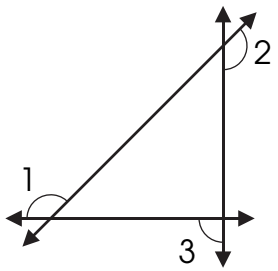
A. 5.88×10^{13} miles

B. 5.88×10^{12} miles

C. 5.88×10^{11} miles

D. 5.88×10^{10} miles

38. Three lines intersect as shown.



What is the sum of the measures of angles 1, 2 and 3 in this figure?

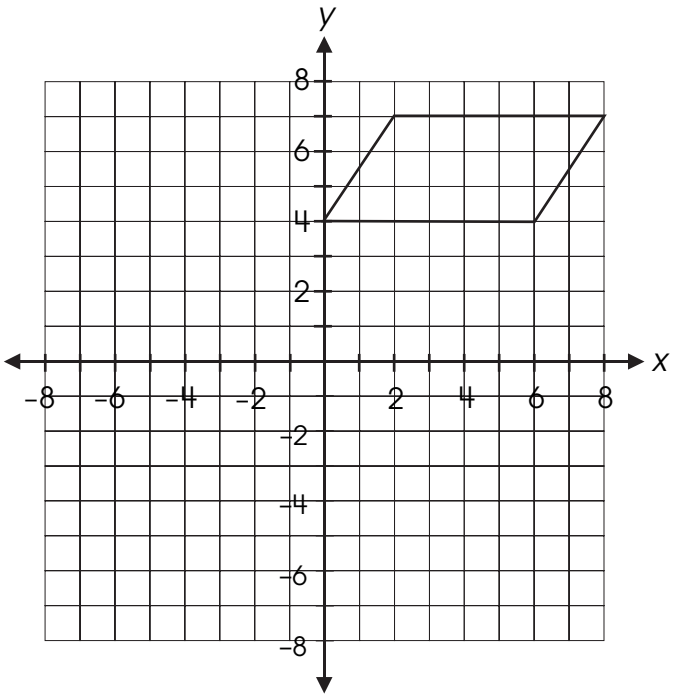
A. 450°

B. 360°

C. 270°

D. 180°

39. The parallelogram shown is translated 4 units to the left and 2 units down.



Which property will remain the same?

A. length of the sides

B. coordinates of the vertices

C. coordinates of the *y*-intercept

D. distance from the vertices to the origin

40. Which statement is true about the quotient when 12 is divided by a fraction greater than zero and less than one?

A. The quotient is undefined.

B. The quotient is equal to 12.

C. The quotient is less than 12.

D. The quotient is greater than 12.

41. The data show the ages of 2 groups of grandparents.

Group 1	65	70	70	70	79	88	88	90
Group 2	60	70	70	75	80	82	83	85

Which statistic has a greater value for Group 1 than Group 2?

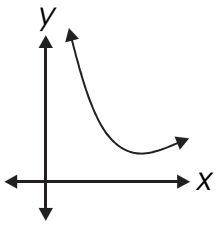
A. the mean

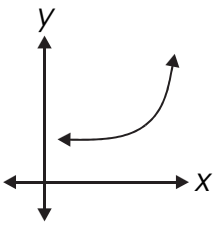
B. the median

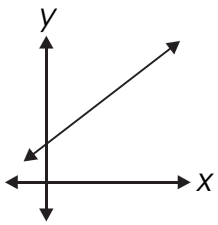
C. the mode

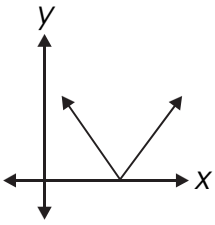
D. the range

42. Which graph represents a linear relationship?

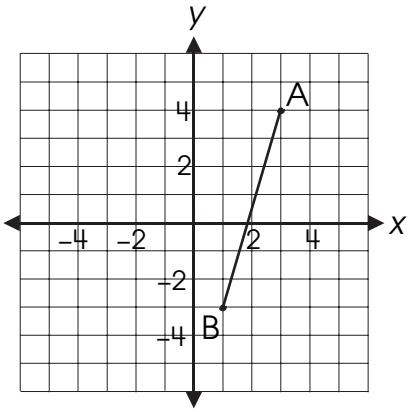
A.


B.


C.


D.


43. The line segment $\overline{AB}$ is shown on the coordinate system.



What is the slope of $\overline{AB}$?

A. $\frac{2}{7}$

B. $-\frac{7}{2}$

C. $-\frac{2}{7}$

D. $\frac{7}{2}$

44. A cup of water is heated in a pan on the stove. The temperature of the water increased from 22°C to 35°C in 20 seconds.

At this rate how long would it take the water temperature to increase from 22°C to 100°C?

A. 2 minutes

B. 3 minutes

C. 5 minutes

D. 6 minutes

STOP