

Student Name _____

OHIO GRADUATION TESTS



Mathematics

Spring 2007

This test was originally administered to students in March 2007. This publicly released material is appropriate for use by Ohio teachers in instructional settings. This test is aligned with Ohio's Academic Content Standards.

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MATHEMATICS TEST

Directions: For multiple-choice questions, solve each problem, choose the correct answer, and then mark the corresponding circle in the Answer Document. If you change an answer, be sure to erase the first mark completely. Located in the math section of the answer document is grid paper that may be useful for multiple-choice items.

For written response questions, answer completely, showing all work, in the space provided in the Answer Document. You may not need to use the entire space provided. Be sure all answers are complete and appear in the Answer Document.

1. Rubin used an altimeter to measure and record his height above sea level at different times during his hike in the mountains.

Which type of data display could Rubin use to show how his height above sea level changed with time?

- A. line graph
- B. circle graph
- C. stem-and-leaf plot
- D. box-and-whisker plot

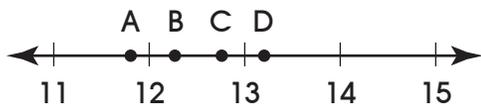
Mathematics

2. The first four rows of a number array are shown below.

Row 1				10
Row 2			20	30
Row 3		40	50	60
Row 4	70	80	90	100

What number will be at the far right end of row 7?

- A. 150
 - B. 210
 - C. 280
 - D. 360
3. The figure shows four points on a number line.



Which point most accurately represents $\sqrt{150}$?

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

4. Helga earns \$6.30 per hour working part-time at the grocery store. She records her starting and ending times each day on her time card.

Helga's Time Card

Date	In	Out
Monday 7/25	10:30 a.m.	2:00 p.m.
Tuesday 7/26	12:45 p.m.	3:30 p.m.
Wednesday 7/27		
Thursday 7/28	12:00 p.m.	4:45 p.m.
Friday 7/29	11:15 a.m.	3:45 p.m.

For question 4, respond completely in your **Answer Document**. (2 points)

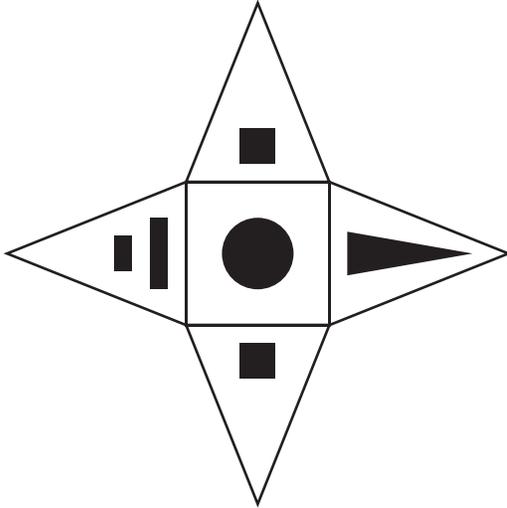
In your **Answer Document**, determine Helga's total wages for the week. Show your work or provide an explanation for your answer.

5. The noon temperatures are recorded for 7 consecutive days in Cleveland, Ohio. The sum of the 7 temperatures is positive.

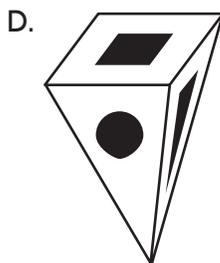
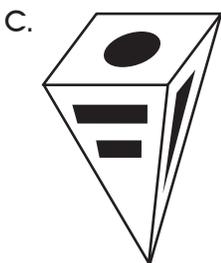
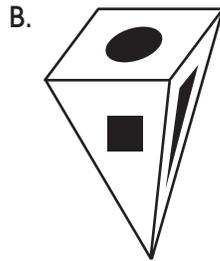
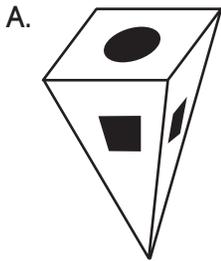
Which statement about these 7 temperatures must be true?

- A. The mean of the temperatures is positive.
- B. The mode of the temperatures is positive.
- C. The median of the temperatures is positive.
- D. The minimum of the temperatures is positive.

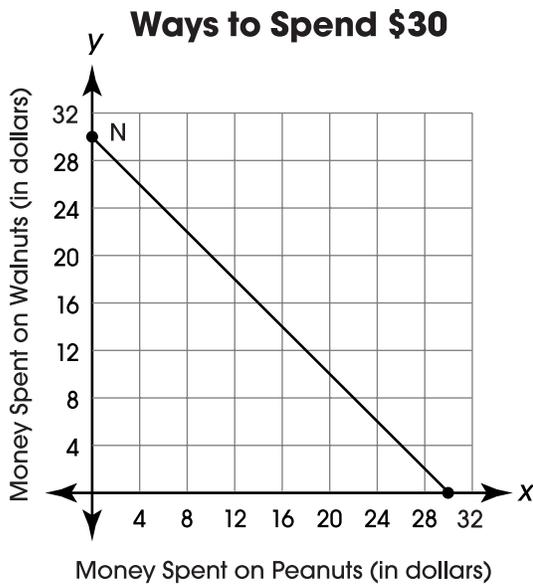
6. The net creates a pyramid.



Which pyramid does this net create?



7. Jamie is buying peanuts and walnuts. He wants to spend exactly \$30. The graph below shows all possible ways that he can split the \$30 between the peanuts and the walnuts.



What does the point N on the graph represent?

- A. spending all \$30 on walnuts
- B. spending all \$30 on peanuts
- C. spending \$20 on peanuts and \$10 on walnuts
- D. spending half of the \$30 on peanuts and half of the \$30 on walnuts

8. Tina plays on the Lakewood High softball team. During her first season, she went to bat 27 times and got 6 hits. If she continues to hit at about the same rate, how many total hits will she have if she bats 40 times?

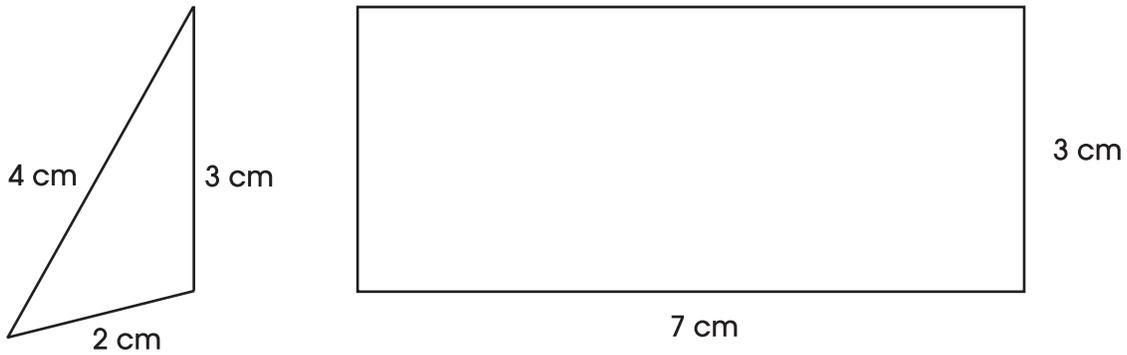
- A. 4
- B. 9
- C. 15
- D. 19

9. Enrica took two days to drive 1,020 miles. On the first day, she drove 10 hours at an average speed of 62 miles per hour. On the second day, her average speed was 57 miles per hour.

Approximately how long did she drive on the second day?

- A. 7.0 hours
- B. 8.6 hours
- C. 10.9 hours
- D. 17.0 hours

10. The diagram below shows two of the faces of a prism.



Ellen is constructing this triangular prism out of cardboard. Ellen plans to draw a shape (a net of the prism) on a piece of cardboard that she can cut out and fold to make the prism.

In your **Answer Document**, sketch a net of the prism that Ellen could use. Place the dimensions on the net.

For question 10, respond completely in your **Answer Document**. (2 points)

**On the March 2007 Ohio Graduation Mathematics Test,
questions 11–16 are field test questions that are not released.**

17. Casey has one afternoon to run errands involving buying a sweater, mailing a package and buying groceries. There are 3 clothing stores, 2 post offices and 4 grocery stores within a 10-mile radius.

How many combinations of 1 clothing store, 1 post office and 1 grocery store are available within a 10-mile radius?

- A. 3
 - B. 9
 - C. 19
 - D. 24
18. Nancy decided to breed gerbils to sell to a pet store. She started with 2 gerbils and determined that they should quadruple in number every 4 months.
- Nancy sold all of the gerbils to the pet store at the end of 1 year.
- How many gerbils did Nancy sell to the pet store?
- A. 24 gerbils
 - B. 66 gerbils
 - C. 128 gerbils
 - D. 512 gerbils

Mathematics

19. Jupiter's diameter is 88,640 miles. How is this measurement expressed in scientific notation?

- A. 8.864×10^3 miles
- B. 0.864×10^4 miles
- C. 8.864×10^4 miles
- D. 88.64×10^4 miles

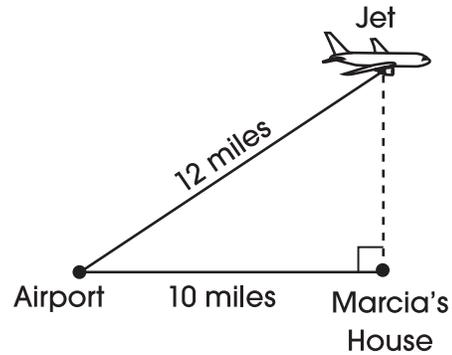
20. Luca randomly chose a marble from a bag, recorded the color and replaced the marble before choosing again. The table shows the number of times each color of marbles was chosen.

Color of Marble	Number of Times Chosen
Red	42
Green	17
Blue	27
Yellow	14

According to the data in the table, what is the experimental probability of picking a green marble?

- A. $\frac{17}{100}$
- B. $\frac{1}{4}$
- C. $\frac{17}{83}$
- D. $\frac{17}{25}$

21. Marcia's house is approximately ten miles east of the airport. A jet is flying directly over her house after taking off from the airport and flying approximately twelve miles, as shown in the diagram below.



Approximately how many miles high is the jet when it flies over Marcia's house?

- A. 2.0 miles
- B. 6.6 miles
- C. 12.0 miles
- D. 15.6 miles

Mathematics

22. The Ohio Big Tree Program lists the largest living specimen of each kind of tree found in the state. Three measurements are needed to assign a score to each tree:

Circumference (1 inch = 1 point)

Height (1 foot = 1 point)

Average crown spread (1 foot = $\frac{1}{4}$ point)

The score is found by adding the number of points for each measurement.

Four trees and their measurements are given below.

For question 22, respond completely in your **Answer Document**. (4 points)

Selected Ohio Big Trees

Big Tree	Circumference (in.)	Height (ft)	Average Crown Spread (ft)
American Basswood	175.0	69.0	68.0
American Beech	222.0	130.0	75.0
Black Oak	249.6	55.0	94.0
Eastern Hemlock	140.0	138.0	52.2

In your **Answer Document**, calculate the scores for each of the four trees in the table. Arrange the trees in order based on their scores. Show work or provide an explanation to support your answer.

Write a formula for computing the score assigned by the Ohio Big Tree Program.

23. Each week, Ms. Haroma has each of the 25 students in her class write his or her own name on a piece of paper. All the pieces of paper are put in a jar and 1 student's name is drawn from the jar.

If Jamie's name was drawn last week, what is the probability that it will be drawn again this week?

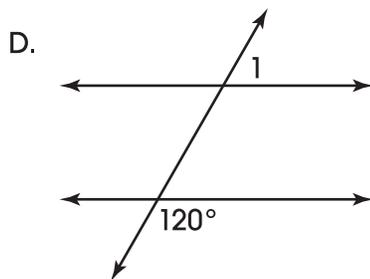
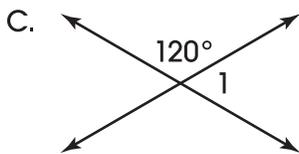
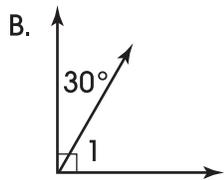
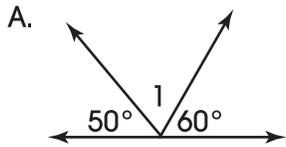
- A. $\frac{1}{2}$
- B. $\frac{1}{25}$
- C. $\frac{1}{50}$
- D. $\frac{1}{625}$

24. Marcy and Troy disagreed about the answer to a problem. Marcy said that the equation they were working on had more than one solution. If Marcy is correct, on which of these equations could they have been working?

- A. $2x + 4 = 3x + 4$
- B. $2x + 4 = 3x + 5$
- C. $2x + 4 = 2(x + 2)$
- D. $2x + 4 = 2(x + 3)$

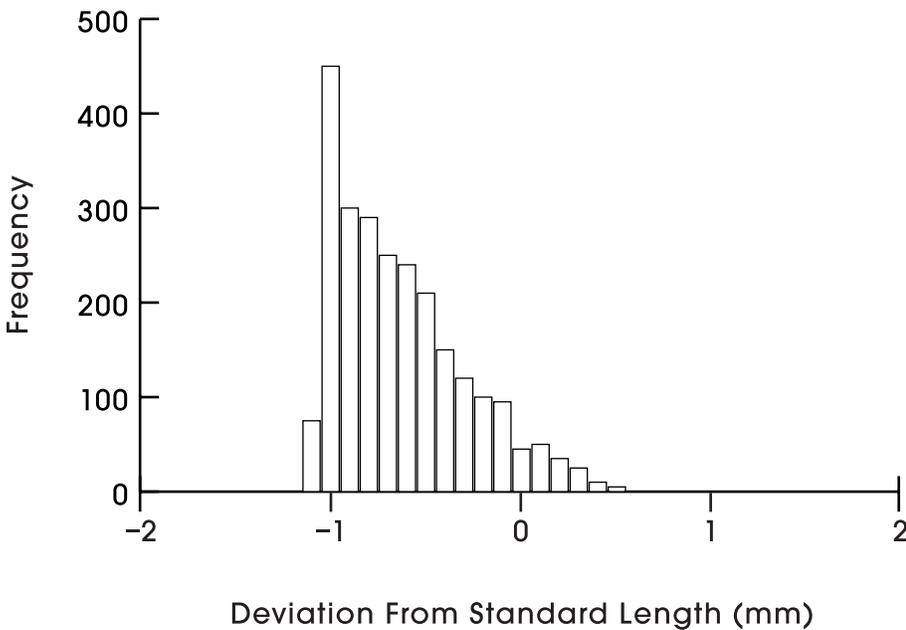
Mathematics

25. In which figure is the measure of $\angle 1$ **not** equal to 60° ?



26. An inspector at a nail factory checks a sample of nails to measure their deviation from the standard length. Positive deviation means a nail is too long, and negative deviation means it is too short.

Nail Lengths

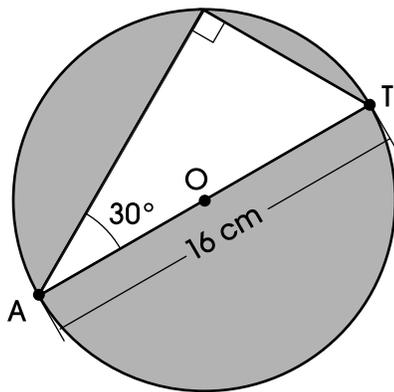


Based on the inspector’s chart above, what is true of the nails produced at this factory?

- A. The nails produced all have the standard length.
- B. The nails are much more likely to be too long than too short.
- C. The nails are much more likely to be too short than too long.
- D. The nails are about as likely to be too long as they are to be too short.

Mathematics

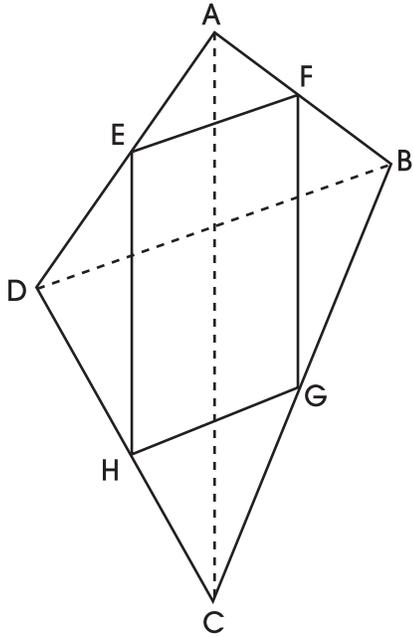
27. In the diagram below, line segment AT is a diameter of the circle with center O .



What is the area of the shaded part of the circle?

- A. 18.3 cm^2
B. 42.3 cm^2
C. 145.6 cm^2
D. 194.1 cm^2
28. Light travels at a speed of 1.86×10^5 miles per second. A light-year is defined to be the distance that light travels in one year.
- In your **Answer Document**, determine the number of miles in one light-year. Write your answer in correct scientific notation. Show all of your work or provide an explanation for your answer.
- For question 28, respond completely in your **Answer Document**. (2 points)

29. Points E, F, G, and H are midpoints of the sides of quadrilateral ABCD.



If $AC = 12$ and $BD = 8$, what is the perimeter of quadrilateral EFGH?

- A. 96
- B. 40
- C. 20
- D. 4

30. A construction company buys \$38,400 worth of new equipment, the value of which decreases linearly so that its value after 8 years is \$2,200. By what amount is the value of the equipment decreasing per year?
- A. \$ 275
 - B. \$4,525
 - C. \$4,800
 - D. \$5,075

31. To test the effect of a new medication on reaction time, two groups of 5 adults were asked to step on a pedal as soon as they saw a flashing light on a video screen. One group received the medication, and the other group did not receive the medication.

The reaction times, in fractions of a second, are shown for each of the two groups.

Group receiving medication:

0.55, 0.65, 0.60, 0.50, 0.70

Group not receiving medication:

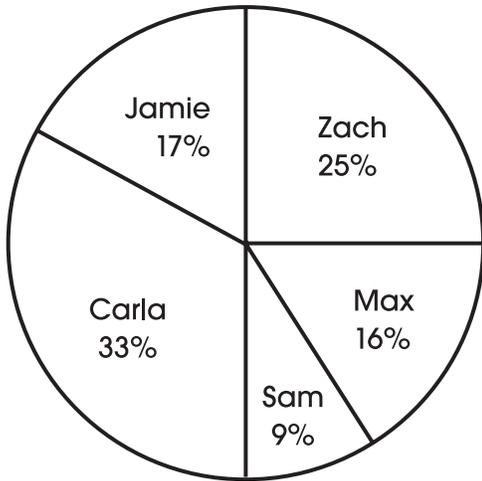
0.20, 0.30, 0.25, 0.20, 0.30

How much longer is the mean reaction time of the group receiving the medication than the group **not** receiving the medication?

- A. 0.35 seconds
- B. 0.40 seconds
- C. 0.50 seconds
- D. 1.75 seconds

32. Six hundred sixty students cast their votes for Junior Class President at Hillmark High School. The results are shown in the graph below.

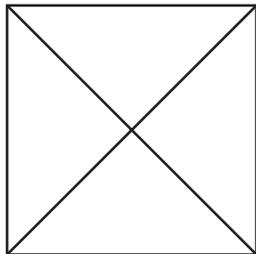
Votes for Junior Class President



If one-third of those who voted for Zach were girls, how many girls voted for Zach?

- A. 220
- B. 165
- C. 110
- D. 55

33. The figure shows a three-dimensional object when viewed from above.



Which of these objects could the sketch represent?

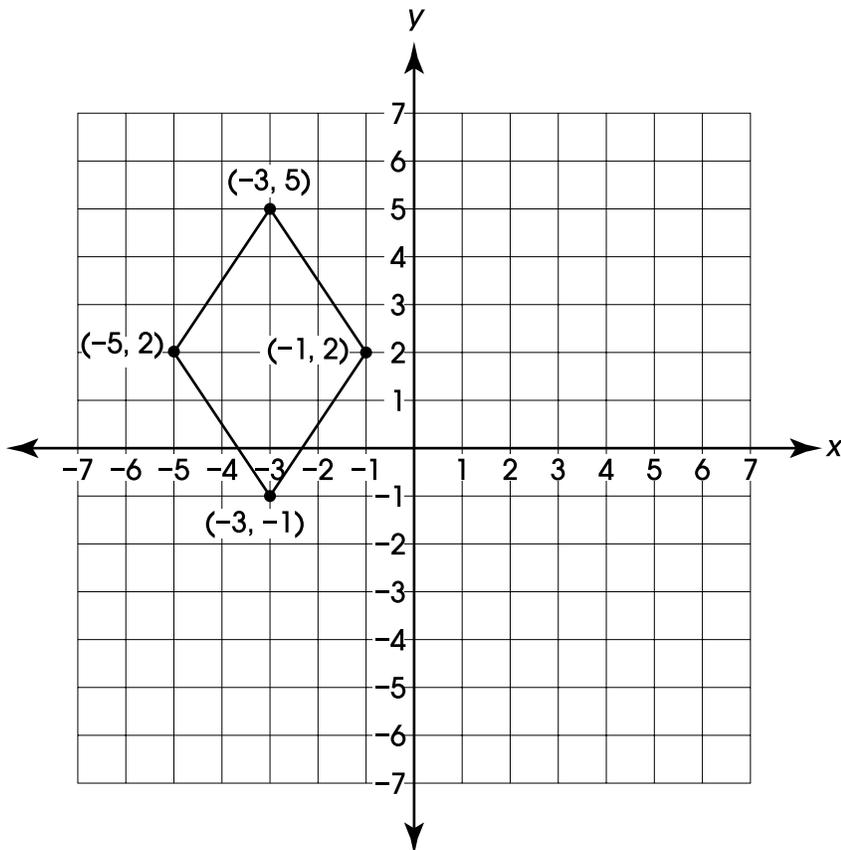
- A. pentagonal pyramid
 - B. rectangular prism
 - C. square pyramid
 - D. triangular prism
34. The local newspaper publishes a list of the five most popular radio stations. Lisa's favorite station is not on the list. At school, she asks two of her friends what their favorite station is, and they both choose Lisa's favorite station. Based on this, Lisa decides her favorite station should have been on the list.

In your **Answer Document**, explain why Lisa's conclusion is **not** valid by giving two reasons why her sample is biased.

For question 34, respond completely in your **Answer Document**. (2 points)

35. Which of the following shows 0.125 , -2.1 , $-\frac{1}{2}$, and 1.2×10^2 ordered from least to greatest?
- A. 1.2×10^2 , 0.125 , $-\frac{1}{2}$, -2.1
- B. 0.125 , $-\frac{1}{2}$, -2.1 , 1.2×10^2
- C. -2.1 , $-\frac{1}{2}$, 0.125 , 1.2×10^2
- D. 1.2×10^2 , $-\frac{1}{2}$, 0.125 , -2.1
36. Janice had a 5-inch high by 3-inch wide photo enlarged to a 3.5-foot tall poster. What should be the approximate width of the poster?
- A. 1.5 feet
- B. 2.1 feet
- C. 4.5 feet
- D. 5.8 feet

37. The quadrilateral below is to be translated 6 units to the right and 3 units down.



Which ordered pair is **not** the coordinates for a vertex of the translated image?

- A. (3, -4)
- B. (3, -1)
- C. (3, 2)
- D. (1, -1)

38. Mr. Richards needs to price items that must be sold within 90 days, and he has two options.

In Option A, Mr. Richards prices items at \$225 and gives \$1.00 off the price for every day that the item does not sell.

For Option B, he prices items at \$250 and gives \$2.00 off for every day the item does not sell.

In your **Answer Document**, write an equation for each option that relates the price of the item to the number of days that the item has not sold.

Use the equations to find the day on which the two options yield the same price.

For question 38, respond completely in your **Answer Document**. (2 points)

39. Rob has 3 red, 4 white, 2 blue, and 5 green T-shirts in his drawer. He picks a red shirt on Monday without looking. He notices a stain and puts the shirt in the wash. Without looking, Rob then picks another shirt from his drawer.

What is the probability he will pick a red shirt on his second try?

- A. $\frac{2}{13}$
- B. $\frac{2}{14}$
- C. $\frac{3}{14} \cdot \frac{2}{14}$
- D. $\frac{3}{14} \cdot \frac{3}{14}$

40. Let x be a negative number. Which expression will be positive?

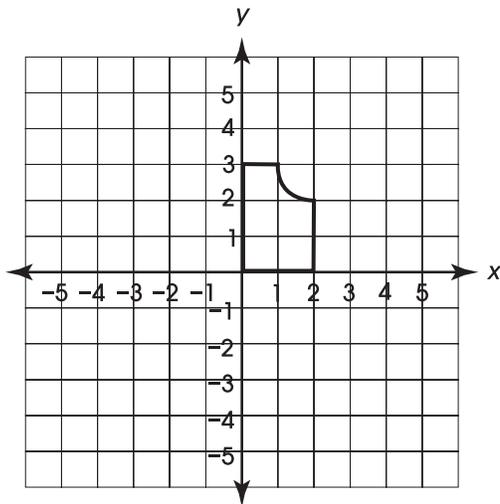
- A. $4x$
- B. x^3
- C. x^4
- D. x^{-3}

41. Bart has a cylindrical pitcher with a radius of 6 cm and a height of 12 cm. He pours 1,300 cubic centimeters of lemonade into the pitcher.

Approximately how much more lemonade will the pitcher hold?

- A. 36 cubic centimeters
- B. 57 cubic centimeters
- C. 622 cubic centimeters
- D. 1,357 cubic centimeters

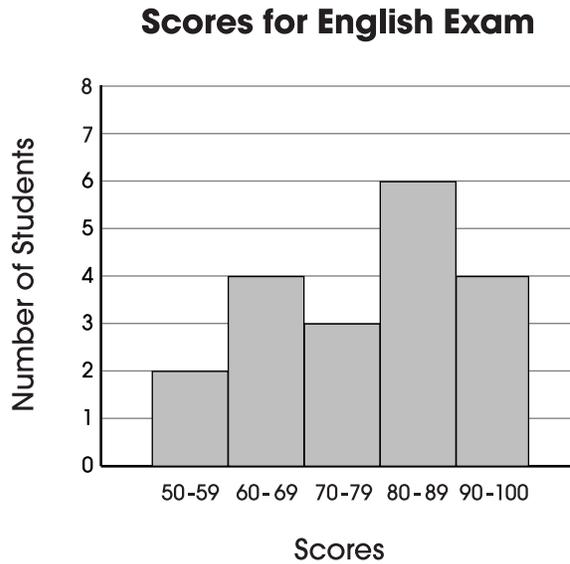
42. Jake is using a computer program to design parts for a new car. He has outlined one-half of a part on a coordinate grid. Rather than drawing the second half, he plans to have the computer reflect this shape over the y -axis.



Which of the following represents the 5 vertices of the reflected shape?

- A. $(0, 0)$; $(0, 2)$; $(-1, 3)$; $(-2, 3)$; $(-2, 0)$
- B. $(0, 0)$; $(0, 3)$; $(-1, 3)$; $(-2, 2)$; $(-2, 0)$
- C. $(0, 0)$; $(0, -3)$; $(1, -3)$; $(2, -2)$; $(2, 0)$
- D. $(0, 0)$; $(0, -3)$; $(-1, -3)$; $(-2, -2)$; $(-2, 0)$

43. The histogram below displays student scores on Mr. Dell's English exam.



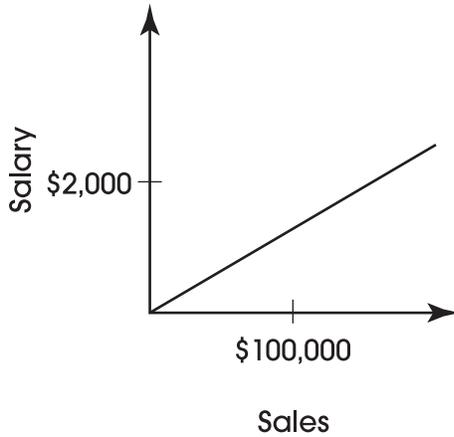
How many students scored below 70 on the exam?

- A. 4
- B. 6
- C. 9
- D. 13

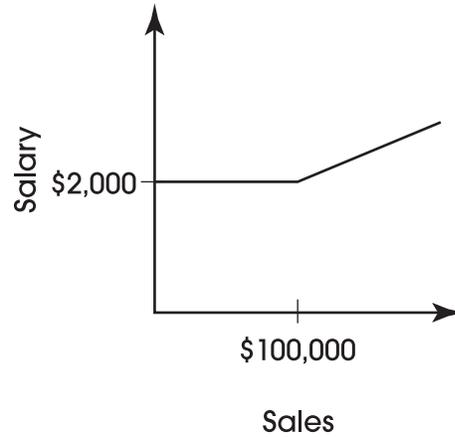
44. Jackie has a job selling cars. Her monthly salary is \$2,000 plus a commission of 1% of her total sales up to \$100,000 and 1.5% of additional sales above \$100,000.

Which graph represents this relationship?

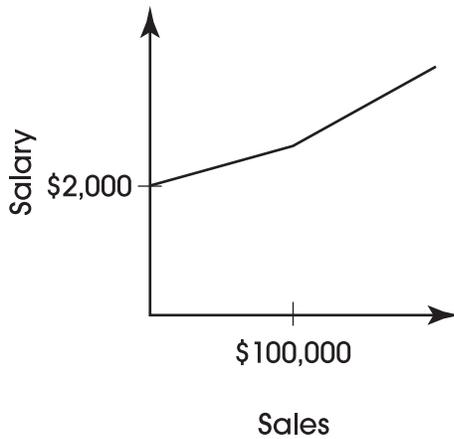
A.



B.



C.



D.



M