

Directions

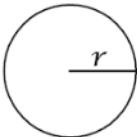
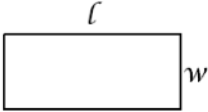
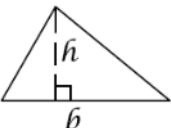
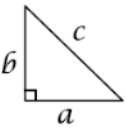
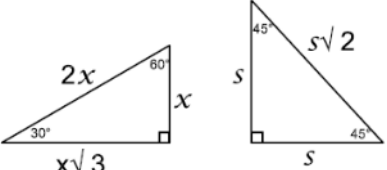
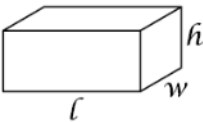
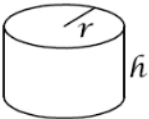

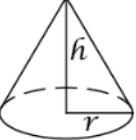
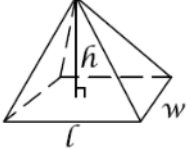
For questions 1-30, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet.

For questions 31-38, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 31 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

Notes

1. The use of a calculator **is permitted**.
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated, the domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

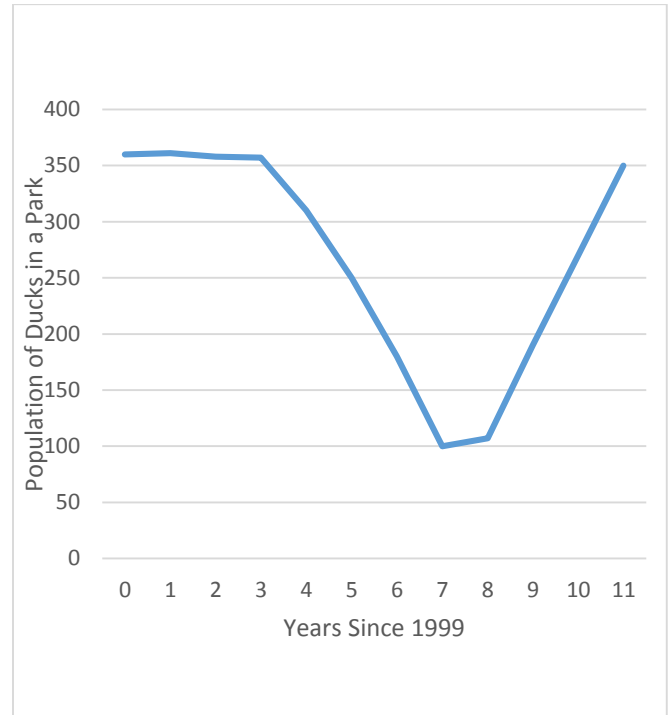
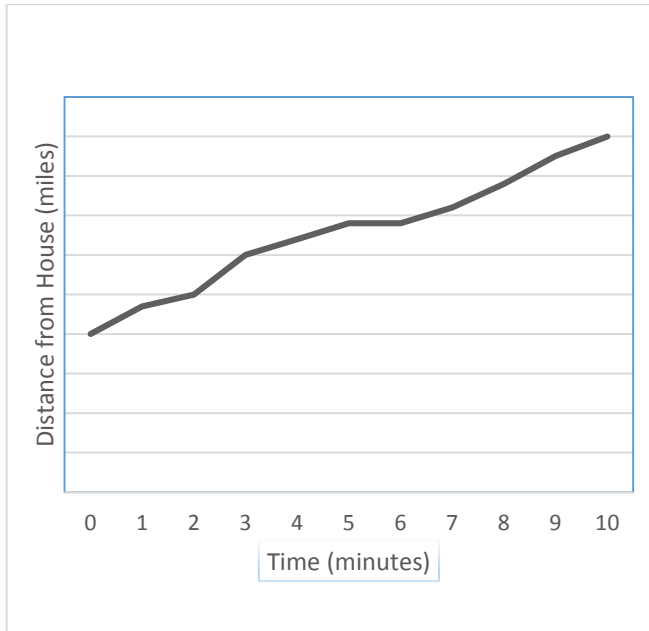
Reference

 $A = \pi r^2$ $C = 2\pi r$	 $A = lw$	 $A = \frac{1}{2}bh$	 $c^2 = a^2 + b^2$	 Special Right Triangles
 $V = lwh$	 $V = \pi r^2 h$	 $V = \frac{4}{3}\pi r^3$	 $V = \frac{1}{3}r^2 h$	 $V = \frac{1}{3}lwh$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is 2π .

The sum of the measures in degrees of the angles of a triangle is 180.



1. The graph above shows Jordan’s distance from his house while he drove to the store. He had to stop at one traffic light on his way to the store. Based on the graph, how long was he stopped at the light?

- A) 1 minute
- B) 2 minutes
- C) 3 minutes
- D) 4 minutes

	Has A Sibling	Does Not Have a Sibling	Total
Male	8	12	20
Female	6	8	14
Total	14	20	34

2. The table above shows the distribution of having a sibling and gender for 34 students in a class. If a student is selected at random, what is the probability that the student will be either a male with a sibling or a female?

- A) $\frac{11}{17}$
- B) $\frac{3}{4}$
- C) $\frac{7}{7}$
- D) $\frac{10}{17}$

3. The graph above shows the population of ducks in a certain park each year from 1999 through 2010. Based on the graph, which of the following best describes the general trend in the population of ducks in this park from 1999 through 2010?

- A) The population generally decreased each year.
- B) The population generally increased each year.
- C) The population generally decreased until 2007 and then generally increased.
- D) The population generally decreased until 2006 and then generally increased.

x	0	1	2	3
$f(x)$	-2	1	4	7

4. The table above shows some values of the function f . Which of the following defines f ?

- A) $f(x) = 2x - 2$
- B) $f(x) = 3^x - 2$
- C) $f(x) = 3x - 2$
- D) $f(x) = -2 + 4x$

5. In a widget factory, approximately 3 percent of all A-widgets and 2 percent of all B-widgets that are produced have defects. If in a day, the factory produced 275 A-widgets and 410 B-widgets, what is a reasonable approximation for the total number of widgets, A-widgets and B-widgets, with defects?

- A) 8
- B) 16
- C) 34
- D) 164

6. $-4x^2 + 3x - 8$
 $5x^2 - 2x - 4$

Which of the following is the sum of the two polynomials shown above?

- A) $x^2 + x - 12$
- B) $-9x^2 + x - 12$
- C) $x^2 + x - 4$
- D) $-9x^2 - 5x - 12$

7. If $4x = \frac{3}{10}$, what is the value of x ?

- A) $\frac{3}{25}$
- B) $\frac{2}{5}$
- C) $\frac{3}{40}$
- D) $\frac{7}{10}$

8. Joanne's math average has increased at a constant rate every year for the past eight years. Her math grade over these past 8 years can be modeled by the equation $g = 2.1x + 79$, where x represents the number of years and g represents her math average. Which of the following best describes the meaning of the number 2.1 in the equation?

- A) The difference in her math average between year 8 and year 1.
- B) The average increase in Joanne's math average every quarter.
- C) The average increase in Joanne's math average every year.
- D) The average number of tests Joanne takes every year.

9. Ezekiel rides his bicycle at an average rate of 15 miles per hour. If he rides at the same rate, which of the following is closest to the distance he'll ride in 145 minutes?

- A) 6 miles
- B) 36 miles
- C) 56 miles
- D) 580 miles

Questions 10 and 11 refer to the following information.

Substance	Density (g/cm ³)
Aluminum	2.7
Gold	19.3
Iron	7.8
Platinum	21.4

The chart above shows the approximate density of different metals in grams per centimeter cubed (g/cm^3) for the four listed metals. The density of a metal is found by using the formula $\rho = \frac{m}{V}$, where ρ is density measured in grams per centimeter cubed, m is mass in grams, and V is the volume in centimeters cubed.

10. What is the mass, in grams, of a block of iron with a volume of 20 centimeters cubed?

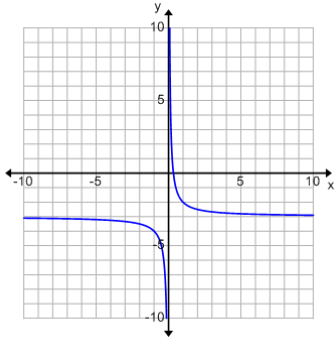
- A) 0.39
- B) 2.56
- C) 27.8
- D) 156

11. A block of aluminum and a block of gold both have the same volume. The block of aluminum has mass of 10 grams. What is the mass of the block of gold, rounded to the nearest tenth?

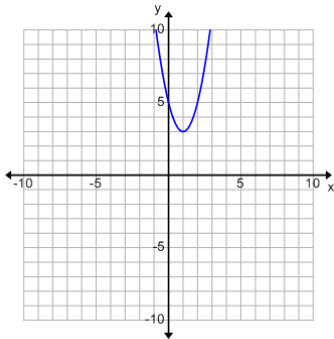
- A) 1.4
- B) 5.2
- C) 29.9
- D) 71.5

12. If the function f , has no zeros, which of the following could represent the graph of function f in the xy -plane?

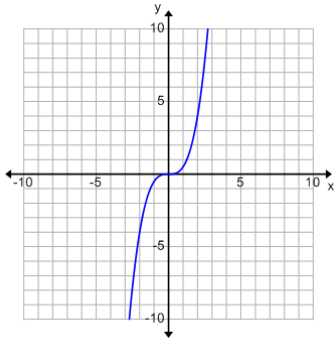
A)



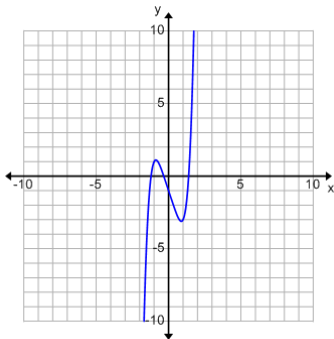
B)



C)



D)



13. $l = -8t^2 + Vt + m$

Given the above equation, which of the following gives V in terms of l , t , and m ?

A) $V = \frac{l-m}{t} + 8t$

B) $V = \frac{l-m-8t^2}{t}$

C) $V = \frac{l+m+8t}{t}$

D) $V = \frac{l-m}{t} - 8t$

14. A cab charges an initial fee of \$3.00 and a rate of \$0.50 for every mile after. What is the cost, c , for a ride of x miles?

A) $c = 3 + (0.5)x$

B) $c = 3x + 0.5x$

C) $c = 3.50 + x$

D) $c = 3x + 0.5$

15. In order to test a new drug, scientists tested two groups of people. Group 1 was given Drug X to improve their hearing. Group 2 was given nothing. At the end of the experiment, some of the members of Group 1 reported that their hearing had significantly improved while the members of Group 2 reported no change.

Based on this information, which statement is correct?

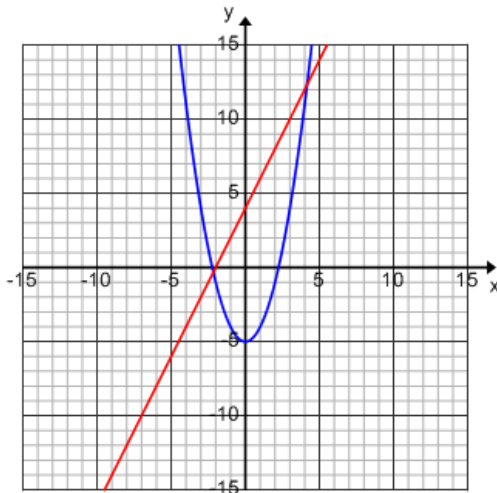
A) Drug X may improve hearing in some people.

B) Drug X will improve the hearing of people that take it.

C) Drug X will cause a big improvement in a person's hearing.

D) Drug X should be prescribed for anyone with hearing problems.

16. The following graph shows the functions f and g . For which of the following values does $g(x) - f(x) = 6$?



- A) $x = 4$
- B) $x = 0$
- C) $x = -1$
- D) $x = 2$

Questions 17 and 18 refer to the following information.

At Amanda's clothing store when the shirts arrive, the supply, S , of shirts depends on the price, p , according to $S(p) = \frac{1}{4}p + 60$. Amanda figured out that the demand for shirts at price p is $D(p) = 180 - p$.

17. How will the supply of the shirts ordered change if the original price was raised by \$40?

- A) It will decrease by 5 shirts
- B) It will increase by 5 shirts
- C) It will increase by 10 shirts
- D) It will increase by 70 shirts

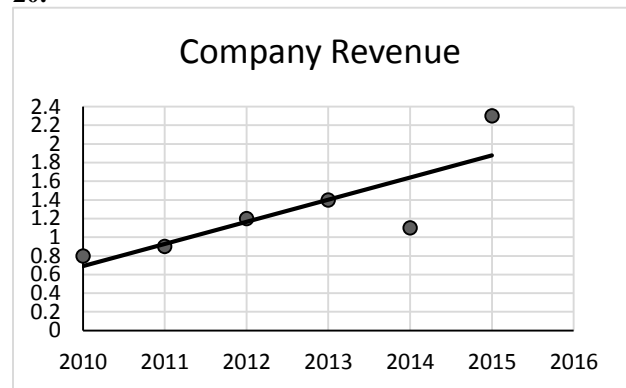
18. At what price will the supply of shirts be equal to demand for the shirts?

- A) \$96
- B) \$195
- C) \$60
- D) \$126

19. One pound of grass seed is needed to seed 400 square feet. A football field has the area of approximately 6,400 yards². How many pounds of grass seed would it take to seed 4 football fields (rounded to nearest whole number)?

- A) 16
- B) 144
- C) 482
- D) 576

20.



The scatterplot above shows yearly revenue, in millions of dollars, for a specific company from 2010 to 2016. The line of best fit for the data is also shown. The company's revenue was about how many millions of dollars different in 2014 than the number of millions of dollars predicted for 2014 by the line of best fit?

- A) 2.5
- B) 2
- C) 0.2
- D) 0.5

21. Joe is setting up an account at a new bank. Which of the plans offered would be most in his favor if he is depositing \$500 and wants to withdraw it in 10 years?

- A) Each year, his account increases by 3%
- B) Each year, his account increases by 1.5%
- C) 2% of the initial savings amount is added each year
- D) \$15 is added each year

22. The sum of four numbers, X , W , Y , and Z , is 761. W is 50% of the value of X , and Y is $\frac{1}{4}$ the sum of W and X . If W is 108, what is the value of Z ?

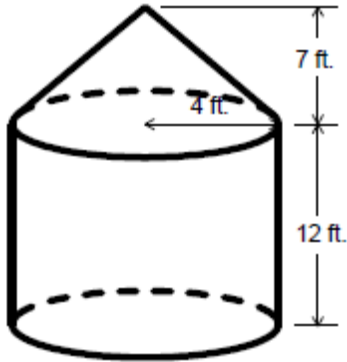
- A) 356
- B) 558.5
- C) 625
- D) 228.5

23. $\sin(a) = \cos(b)$. If $a = \frac{k}{4} + 2k - 8$ and $b = 4k - 2$, what is the value of k ?

- A) $k = 16$
- B) $k = 24$
- C) $k = 10$
- D) $k = 8$

24. Mrs. Rays is giving out stickers to her class. If she gives each student 4 stickers, she would have 6 left over. If she wanted to give each student 5 stickers, she would need 22 more stickers. How many students are in her class?

- A) 28
- B) 30
- C) 22
- D) 26



25. If the water tower were to be filled completely with water, what would be the total volume of water in the tower (rounded to the nearest tenth)?

- A) 720.5
- B) 720.4
- C) 725.2
- D) 746.4

26. In the xy -plane, the line determined by the points $(-12, y)$ and $(3, 5)$ and the line formed by the points $(2, 6)$ and $(7, 7)$ have the same slopes. What is the value of y ?

- A) 2
- B) 3
- C) 4
- D) 8

27. A rectangle was changed by increasing its length by 200 percent and decreasing its width by p percent. This change increased the area of the rectangle by 176 percent. What is the value of p ?

- A) 8
- B) 10
- C) 90
- D) 92

28. A zoo is buying tigers for an exhibit. The zoo bought 26 tigers and believe that this population will increase by 5% every 20 years. Which of the following expressions shows the estimated population of the tigers t years from now?

- A) $26(1.05)^{20t}$
- B) $26(1.05)^{\frac{t}{20}}$
- C) $26(1.05)^{20-t}$
- D) $26(1.05)^{20+t}$

29.

Gender	Hair Color	
	Dark	Light
Male		
Female		
Total	74	29

A senior class is made up of 103 students and features of the students were represented in the table above. There are four times as many dark-haired males as light-haired males. There are twice as many dark-haired females as light-haired females. Which of the following is the closest to the probability that a light-haired female student will be selected, if one of the 103 students is selected at random.

- A) 0.20
- B) 0.25
- C) 0.28
- D) 0.38

30. $5x + b = 8x - 7$
 $5y + c = 8y + 4$

In the equation above, b and c are constants. If b is c minus 1, which of the following is true?

- A) x is y minus 4
- B) x is y plus 4
- C) x is y plus $3\frac{1}{3}$
- D) x is y minus $\frac{1}{4}$

31. A local movie theater charges \$12 per ticket for children and 15 per ticket for adults. If Maria spends at least \$54 but no more than \$78 on x child tickets and 2 adult tickets, what is one possible value of x ?

Test Grades on the 5 th Grade Math Final			
Student	Grade	Student	Grade
James	88	Aaron	72
Michael	82	Blake	77
Jessica	75	Timothy	65
Matthew	90	Dennis	89
Jade	92	Jenna	70
Andrew	80	Julia	95
Nicole	93	Amanda	81

32. The table above lists the grades received by 14 fifth grade students. According to the table, what was the mean grade received by these students? (Round your answer to the nearest tenth.)

33. $(-9x^2 + 7x - 1) - 2(x^2 + 3x + 1)$

If the expression above is rewritten in the form $ax^2 + bx + c$, where a , b , and c are constants, what is the value of b ?

34. In a circle with center c , central angle ACB has a measure of $\frac{7\pi}{6}$ radians. The area of the sector formed by central angle ACB is what fraction of the area of the circle?

35. A professional basketball player can play between 0 and 48 minutes per game, inclusive. In the first 20 games, the player averaged 30 minutes per game. What is the least minutes the player can play in the 21st game and still be able to have an average of 38 minutes played per game for the first 40 games?

36. $y \geq -12x + 4000$

$y \geq 8x$

In the xy -plane, if a point with coordinates (a,b) lies in the solution set of the system of inequalities above, what is the minimum possible value of b ?

Questions 37 and 38 refer to the following information.

Jenna works at a clothing store in the mall. If Jenna can fold shirts at an average rate of x shirts per minute, and she folds shirts for an average time of N minutes per day, the average number of shirts she folds in one day, S , is given by the formula $S = xN$.

Jenna estimates that she folds shirts at an average rate of 5 shirts per minute and that she folds shirts for an average of 8 minutes per day. Using the formula $S = xN$, Jenna estimates that she folds 40 shirts per day.

37. The formula $S = xN$ can be applied to folding any type of clothing, such as a pair of jeans or shorts. Jenna determines that over the course of a month she folds jeans for an average of 7 minutes per day at an average rate of 8 jeans per minute. Using Jenna's estimations for this month, about how many jeans does Jenna fold per day?

38. Allison also works at a clothing store. She estimates that she can fold shirts at an average rate of 240 shirts per hour and that she folds shirts for an average of 9 minutes per day. The average number of shirts that Allison folds per day is what percent less than the average number of shirts that Jenna folds per day? Ignore the percent symbol when entering your answer.