

1.

$$(4x^2 + 15x) - (-7x^2 + 6x) =$$

- A)  $11x^2 - 9x$
- B)  $11x^2 + 21x$
- C)  $-3x^2 - 9x$
- D)  $-3x^2 + 21x$

2.

A local car dealership sells cars for \$20,000 each and pick-up trucks for \$35,000 each. If the car dealership sold 18 cars and pick-up trucks last month totaling \$450,000 worth of sales, then how many cars did the dealership sell last month?

- A) 10
- B) 12
- C) 20
- D) 25

3.

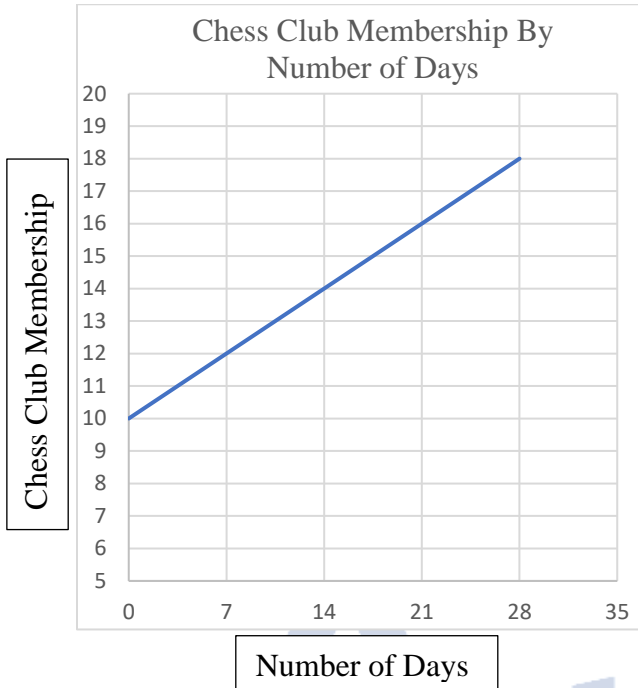
Anderson High School Golf Team Scores

75	76	78	78	80
82	83	83	83	83
85	86	87	87	118

The table above lists the recorded golf scores for Anderson High School's women's golf team in their latest competition. The outlier score of 118 is an error. Of the mean, median, and range of the values listed, which will change the most if the score of 118 is removed from the data?

- A) Mean
- B) Median
- C) Range
- D) They will all change by the same amount

Questions 4 – 5 refer to the following information.



The chess club at Robinson High School is beginning a membership drive to recruit new members to join the club. The club meets every week and attendance is taken.

4.

What does the y-intercept represent in the graph?

- A) The number of members the chess club adds each week
- B) The number of days the chess club spends recruiting members
- C) The initial number of chess club members
- D) The total number of members who joined the club

5.

If the trend continues, how many members can be expected in the chess club by week 6?

- A) 20
- B) 22
- C) 28
- D) 35

6.

If Marquis jogs 100 meters in 28 seconds, then approximately how far is Marquis expected to run in 12 minutes?

- A) 2400 meters
- B) 2600 meters
- C) 2800 meters
- D) 3000 meters

7.

A shelf in a grocery store holds gallons of water. The shelf has space for a maximum capacity of 30 gallons, but can hold no more than 210 pounds of weight. If each gallon of water weighs approximately 8.34 pounds, then what is the maximum number of gallons the shelf can hold?

- A) 25
- B) 30
- C) 50
- D) 834

8.

Football Watching Preference, By US Region

	Southeast	Northeast	Midwest	West	TOTAL
NFL	15	68	43	61	187
College Football	71	24	35	29	159
High School Football	14	8	22	10	54
TOTAL	100	100	100	100	400

The data in the table above were produced by asking 100 football fans from each region of the United States to name their favorite type of football to watch.

What approximate percentage of the NFL fans surveyed are from either the Northeast or the Midwest?

- A) 28%
- B) 47%
- C) 51%
- D) 59%

9.

x	0	1	2	3	4
f(x)	1	3	9	19	33

For the data table above, which of the following defines  $f(x)$  for the values listed?

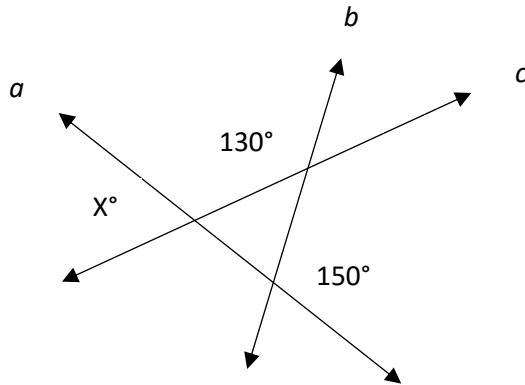
- A)  $2x^2 + 1$
- B)  $2x^2 + 1$
- C)  $x^2 + 2$
- D)  $3x^2 - 3$

10.

Tickets to a movie are \$8 for adults and \$5 for children. If 38 total tickets are sold for a total cost of \$259, how many children's tickets are sold?

- A) 5
- B) 13
- C) 15
- D) 23

11.



For intersecting lines  $a$ ,  $b$ , and  $c$ , what is the value of  $x$ ?

- A) 30
- B) 50
- C) 80
- D) 100

12.

If Jasmine earns scores of 87, 90, 95, and 78 on her first four history tests, what does she need to score on her fifth test in order to have a test average of 90 in the class?

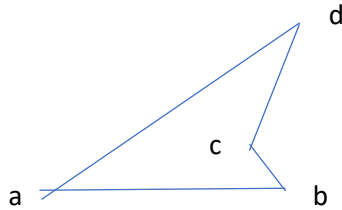
- A) 85
- B) 95
- C) 97
- D) 100

13.

The graph of which of the following equations has a  $y$ -intercept of  $-5$  and a slope of  $\frac{1}{2}$ ?

- A)  $4y - 20x = 2$
- B)  $\frac{1}{2}x - y = 5$
- C)  $y - 5 = x$
- D)  $5x + \frac{1}{2}y = 1$

14.



For quadrilateral ABCD above, if  $\angle a = 47^\circ$ ,  $\angle b = 65^\circ$ , and  $\angle c = 212^\circ$ , then what is the value of  $\angle d$ ?

- A)  $36^\circ$
- B)  $68^\circ$
- C)  $100^\circ$
- D)  $112^\circ$

15.

The All-Star Basketball Clinic claims that every participant is guaranteed to improve free throw shooting percentage. To test this, 50 basketball players are selected at random and complete the clinic's training.

Afterwards, all 50 players were found to have improved their free throw shooting percentage. Which of the following conclusions can be drawn from the data?

- A) The clinic will improve the free throw shooting of all participants.
- B) Anyone who participates in the clinic will improve free throw shooting percentage.
- C) The clinic is likely to improve the free throw shooting percentage of its participants.
- D) The clinic improves the free throw shooting percentage of its participants better than any other clinic.

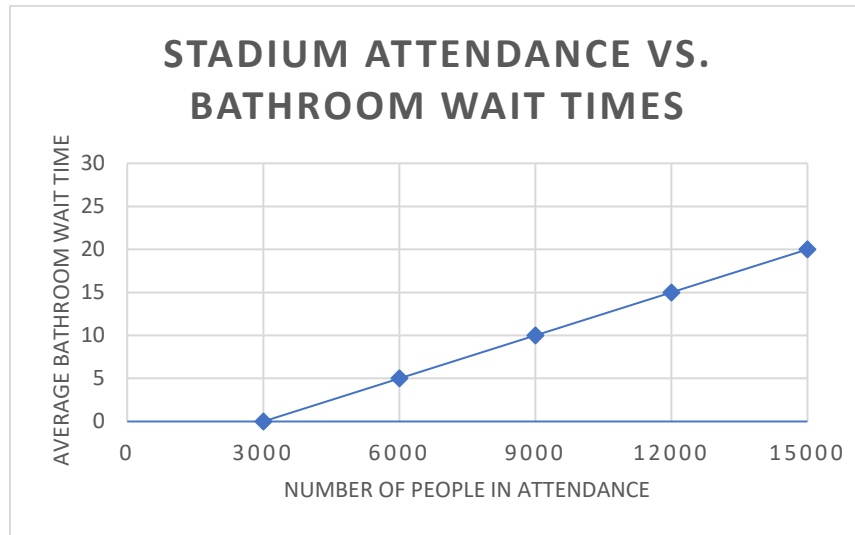
16.

$$5(x^2 - 2) + 3(x - 20) = 4x(x + 2) - 11(x - 1)$$

For the expression above, which of the following is a value of  $x$ ?

- A) 0
- B) 2
- C) 5
- D) 9

17.



The above graph shows the number of people in attendance at an event in a stadium,  $x$ , and the average wait time to use the bathroom,  $y$ . The line of best fit for the data is shown as well. Which of the following equations best models the line of best fit?

- A)  $y = \frac{1}{600}x - 5$   
 B)  $y = 600x - 5$   
 C)  $y = 600x + 3000$   
 D)  $y = \frac{1}{600}x - 3000$

18.

If  $\sqrt{2m - 23} + 7 = 10$ , then what's the value of  $m$ ?

- A) 3  
 B) 16  
 C) 23  
 D) 51

19.

An office has two photocopier machines. Machine A can print 100 pages per minute, while Machine B can print 75 pages per minute. If Machine B starts printing, and 4 minutes later, Machine B starts printing, then how many minutes after Machine A begins printing will the two machines have printed the same number of copies?

- A) 5  
 B) 8  
 C) 10  
 D) 12

20.

A local pizza delivery restaurant needs to hire staff. In particular, the manager needs to hire at least 3 delivery drivers and at least two cooks. Each delivery driver will be paid \$7.50 per hour and each cook will be paid \$11 per hour. The restaurant owner has made it clear that the total payroll hourly expenses are to cost no more than \$70 per hour. Which of the following inequalities best expresses this situation in terms of  $x$  and  $y$ , where  $x$  is the number of delivery drivers and  $y$  is the number of cooks?

A)  $x \geq 3$

$y \geq 2$

$7.50x + 11.00y \geq 70.00$

B)  $x \geq 3$

$y \geq 2$

$7.50x + 11.00y \leq 70.00$

C)  $x \leq 3$

$y \leq 2$

$7.50x + 11.00y \geq 70.00$

D)  $x \leq 3$

$y \leq 2$

$7.50x + 11.00y \leq 70.00$

21.

$$f(x) = \frac{5}{(x+6)^2 - 2(x+7) - 1}$$

For what values of  $x$  is the function above undefined?

A)  $(-7, -6)$

B)  $(-7, -3)$

C)  $(7, 3)$

D)  $(7, 6)$

22.

If the base of a triangle increases by 20% and the height decreases by 20%, then the area of the triangle:

A) Remains the same

B) Increases by 20%

C) Decreases by 20%

D) Decreases by 4%

23.

Marshawn is a web developer and charges an upfront monthly rate of \$1000 for his services, which includes 14 hours of service, and each additional hour is billed at a rate of \$70 per hour. If a business hires Marshawn and the three owners decide to evenly split the cost of his services, which of the following algebraic expressions best represents the monthly cost for each business owner?

A)  $\frac{70x+1000}{3}$

B)  $\frac{70x+1000x}{3}$

C)  $210x + 3000$

D)  $\frac{14(70x+1000)}{3}$

24.

Ms. Williams gave an Algebra I test to her first and second period classes. The results are shown below:

1<sup>st</sup> Period

80	83	82
81	80	77
80	85	81
77	81	80
75	80	79

2<sup>nd</sup> Period

80	60	80
100	80	75
95	85	90
55	65	100
90	95	50

Based on the data, which of the following statements must be true?

- A) The standard deviation for 1st period is larger
- B) The standard deviation for 1<sup>st</sup> and 2<sup>nd</sup> period is the same
- C) The standard deviation for 2nd period is larger
- D) The standard deviation cannot be determined for either class

25.

A shopper spends \$1330 at a store purchasing a new laptop computer, and the amount spent includes an 8% sales tax. To the nearest dollar, what was the price of the computer before tax?

- A) \$1,135
- B) \$1,224
- C) \$1,231
- D) \$1,436

26.

For a circle with the equation  $(x + 4)^2 + (y - 5)^2 = 16$ , which of the following points lies inside the circle?

- A) (-7, 6)
- B) (-4, -1)
- C) (0, 6)
- D) (4, -5)



27.

Number of Puppies Born in a Litter 2020

Number of Puppies	Frequency
1	1
2	3
3	10
4	22
5	37
6	15
7+	12

100 litters of puppies were born at an animal shelter in 2020, and the number of puppies in each litter and the frequency with which that number of puppies occurred is displayed in the data table above. Based on the table, what is the median number of puppies born in a litter?

- A) 3
- B) 4
- C) 5
- D) 6

28.

If  $540^\circ = g\pi$  radians, then what is the value of  $g$ ?

- A) 2
- B) 3
- C) 4
- D) 5

29.

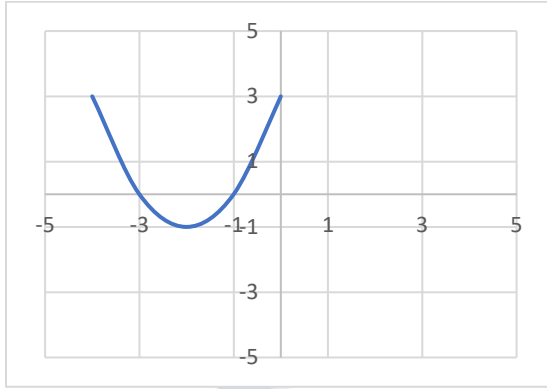
$\frac{3^a}{9^b} = 27$  for some constants  $a$  and  $b$ . If  $b = 2$ , then what's the value of  $a$ ?

- A) 3
- B) 4
- C) 6
- D) 7

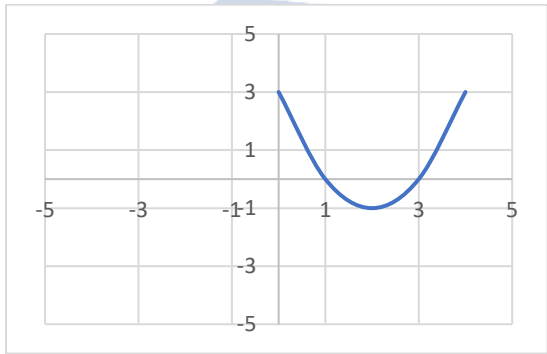
30.

$$f(x) = x^2 + mx + 3$$

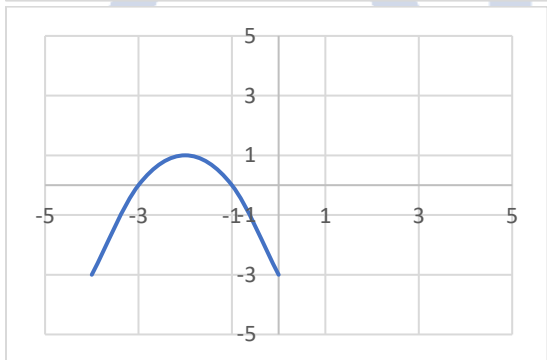
For the quadratic equation above, the constant  $m$  is a positive integer. Which of the following graphs could represent the function  $f$ ?



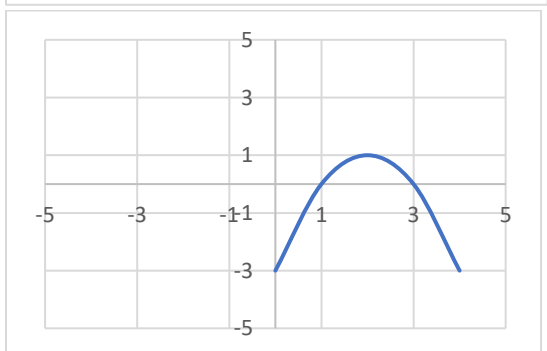
A)



B)



C)



D)

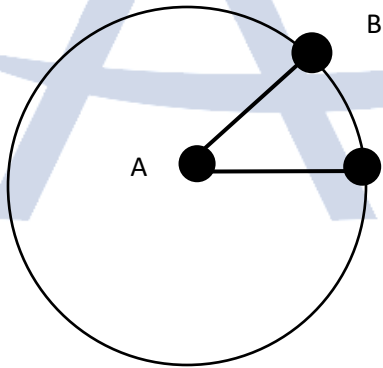
31.

A cookie recipe will make 18 cookies using 3 cups of flour and 1 cup of sugar. If a person wishes to make 5 dozen cookies, then how many cups of flour will be needed?

33.

A fence building company charges a flat fee of \$300 plus  $x$  dollars per foot of fencing. If a yard requires 70 feet of fencing and the customer paid \$1700 total, then how much does the company charge for each foot of fencing?

32.



For the circle above, the length of arc  $\widehat{BC}$  is  $4\pi$ , and the total circumference of the circle is  $32\pi$ . What is the measure of  $\angle BAC$ ?

34.



For the cylinder above,  $h = 8$  and the circumference of the base =  $6\pi$ . If the volume of the cylinder is  $x\pi$  cubic liters, what is the value of  $x$ ?

35.

The population of a colony of mice can triple each month, and the total population can be modeled by the expression  $20(x)^t$ , with  $t$  given in months. What is the value of  $x$  in this expression?

36.

The functions  $y = x^2 - 14x + 49$  and  $y = 16$  intersect at two points. What's the value of the distance between the two points?

37.

In a right triangle, if the  $\sin x = \frac{3}{5}$ , then  $\cos(90 - x) = \underline{\hspace{2cm}}$ ?

38.

If  $(x + 5)^2 - 4(x + 2) = hx^2 + kx + m$  for some constants  $h$ ,  $k$ , and  $m$ , what is the value of  $k$ ?

## Answer Key

1. A
2. B
3. C
4. C
5. B
6. B
7. A
8. D
9. A
10. C
11. D
12. D
13. B
14. A
15. C
16. D
17. A
18. B
19. D
20. B
21. B
22. D
23. A
24. C
25. C
26. A
27. C
28. B
29. D
30. A
  
31. 10
32. 45
33. 20
34. 72
35. 3
36. 8
37.  $\frac{3}{5}$
38. 6

