

1. If an electric vehicle can travel 280 miles on a full charge and each charge takes 30 minutes to complete, how much time is spent charging for the vehicle to travel 3,360 miles?
  - a. 24 hours
  - b. 56 hours
  - c. 112 hours
  - d. 6 hours
  - e. 12 hours
  
2. Joe consumes 20 gallons of ice cream per year. If he wants to cut back the amount of ice cream he eats by 25% and the rate of consumption does not change from month to month, how much ice cream will he eat in 3 months?
  - a. 1.25 gallons
  - b. 3.75 gallons
  - c.  $\frac{20}{3}$  gallons
  - d. 5 gallons
  - e. 15 gallons
  
3. The height of a box is half its length and the length is double its width. If the volume of the box is 16 inches<sup>3</sup>, what is the length of the box?
  - a. 2 inches
  - b. 3 inches
  - c. 4 inches
  - d. 6 inches
  - e. 8 inches
  
4. The area of a rectangle is 48 cm<sup>2</sup>. If the length is three times as long as its width, what is the length of the rectangle in centimeters?
  - a. 4
  - b. 6
  - c. 8
  - d. 12
  - e. 16
  
5. A recipe for cake calls for butter, sugar and flour in a ratio of 2:3:5 respectively by weight. If Cristina uses 180 grams of sugar, what is the total weight of butter and flour in grams?
  - a. 240
  - b. 300
  - c. 360
  - d. 420
  - e. 900
  
6. The average of five numbers is 16. If four of the numbers are 7, 12, 18, & 24, what is the median of the five numbers?
  - a. 12
  - b. 18
  - c. 19
  - d. 21
  - e. 24
  
7. Danny is a track & field athlete and increased his weekly run distance by 20% from the previous year as part of his training regimen. If he now runs 15 miles a week, how many miles did he average a week last year?
  - a. 10
  - b. 12
  - c. 12.5
  - d. 13
  - e. 14
  
8. Andy has taken 5 quizzes with scores of 90, 75, 80, 95 & 100. What must he score on the 6<sup>th</sup> quiz if the average of all quizzes taken is 85?
  - a. 65
  - b. 70
  - c. 75
  - d. 80
  - e. 85

9. Josh is an auto technician who charges \$30 an hour plus a flat diagnostic fee of \$50 per vehicle. If Josh earned \$490 working 8 hours, how many vehicles did he work on?
- 3
  - 4
  - 5
  - 6
  - 7

10. A vat contains a 20 gallon chemical mixture that is 35% water by volume. How many gallons of water must be added to the vat for the mixture to be 50% water by volume?
- 5
  - 6
  - 7
  - 8
  - 10

11. Rouses is selling crawfish by the pound and is offering a discount for large orders. The price per pound is determined by the total weight of the order as shown in the table below. Eric purchases 4 pounds of crawfish on Monday, 9 pounds of crawfish on Wednesday and 3 pounds of crawfish on Saturday. How much money would he have saved if he purchased all the crawfish on Monday?

Weight of crawfish in order in pounds	Price per pound
1-3	\$5.00
4-6	\$4.50
7+	\$4.25

- \$3.25
- \$3.75
- \$4.25
- \$4.75
- \$5.25

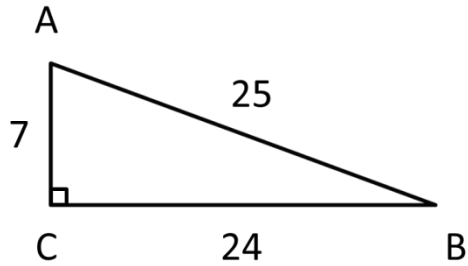
12. Elise runs 12 miles in  $2\frac{1}{2}$  hours. Assuming she runs at a constant pace, how many minutes does it take her to run 2 miles?
- 18
  - 20
  - 25
  - 30
  - 35

13. A 13 foot ladder is leaning against a 12 foot fence such that the top of the ladder meets the top of the fence. How far is the base of the ladder from the fence in feet?
- 5
  - $5\sqrt{2}$
  - $5\sqrt{3}$
  - 6
  - $6\sqrt{3}$

14. A farmer has 48 feet of wire to create a square pig pen. If one of the sides is enclosed by a wall such that the wire spans 3 sides of the pig pen, what is the area of the pig pen?
- 144 ft<sup>2</sup>
  - 196 ft<sup>2</sup>
  - 225 ft<sup>2</sup>
  - 256 ft<sup>2</sup>
  - 324 ft<sup>2</sup>

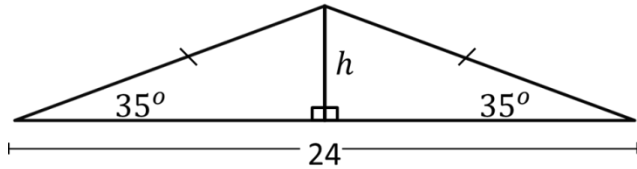
15. A locomotive transporting supplies leaves its station heading for a town that is 6 miles south and 8 miles east of the station. What is the distance in miles from the station to the town?
- $6\sqrt{2}$
  - $6\sqrt{3}$
  - $8\sqrt{2}$
  - $8\sqrt{3}$
  - 10

16. In the figure below, which of the following is cosine of  $\angle ABC$ ?



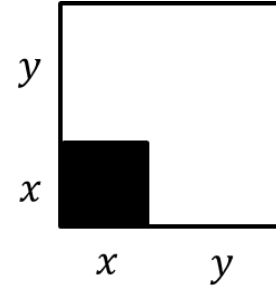
- a.  $\frac{7}{24}$
- b.  $\frac{7}{25}$
- c.  $\frac{24}{25}$
- d.  $\frac{24}{7}$
- e.  $\frac{25}{24}$

17. In the figure below, which of the following expressions represents the value of  $h$ ?



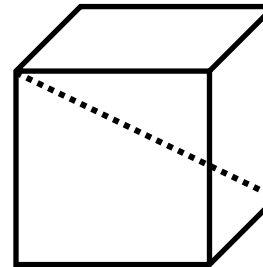
- a.  $12 \sin(35^\circ)$
- b.  $12 \tan(35^\circ)$
- c.  $24 \tan(35^\circ)$
- d.  $\frac{12}{\sin(35^\circ)}$
- e.  $\frac{24}{\tan(35^\circ)}$

18. The figure below are two squares where each side of the smaller square is  $x$  inches and each side of the larger square is  $y$  inches longer than the smaller square. Which of the following expressions represents the area of the unshaded region?



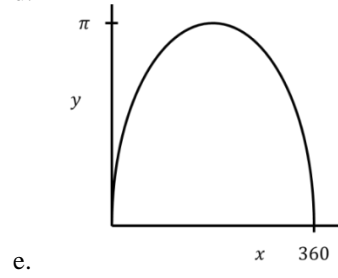
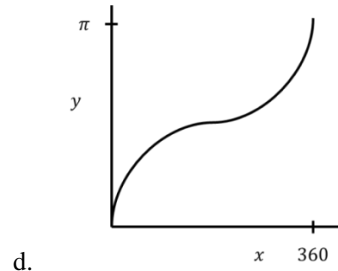
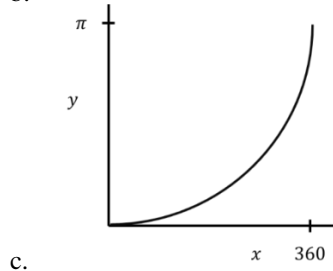
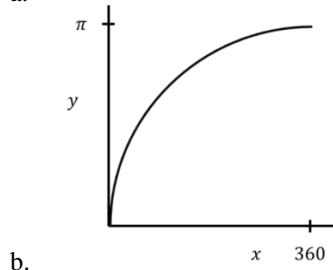
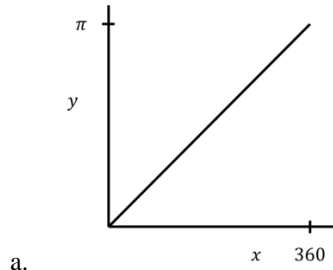
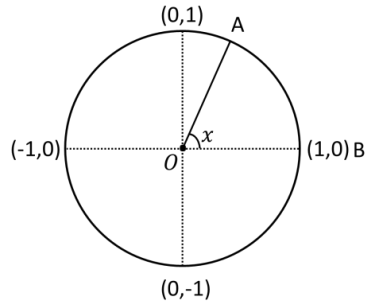
- a.  $x^2 + y^2$
- b.  $y^2 - x^2$
- c.  $(x + y)^2$
- d.  $(x + y)^2 - x^2$
- e.  $(x + y)^2 - (y - x)^2$

19. A cube has a length, width & height that are 2 inches each. What is the length of the diagonal in inches that runs from one corner of the cube to the other?

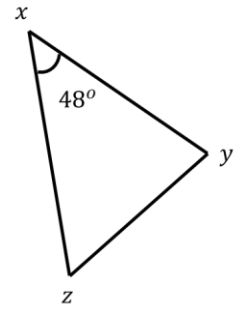


- a.  $2\sqrt{2}$
- b.  $2\sqrt{3}$
- c.  $3\sqrt{2}$
- d.  $3\sqrt{3}$
- e.  $4\sqrt{3}$

20. The figure below is a unit circle where  $x$  can range from  $0^\circ$  to  $360^\circ$ . Which of the following graphs represents the area  $y$  of sector AOB?

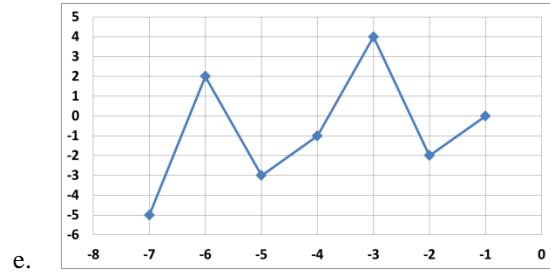
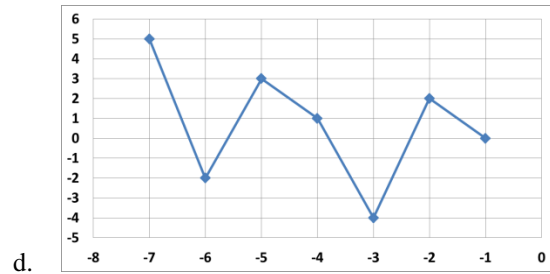
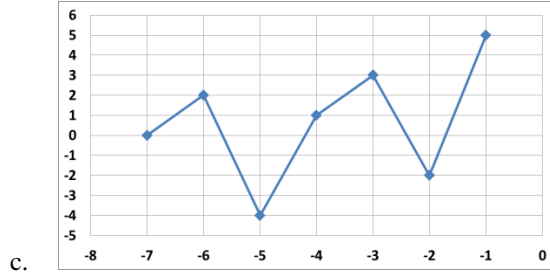
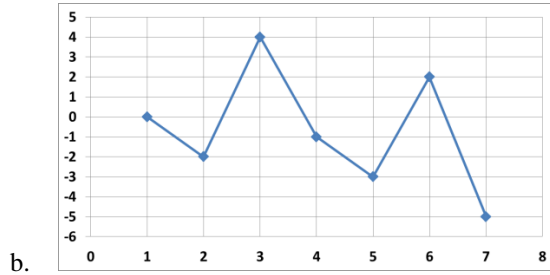
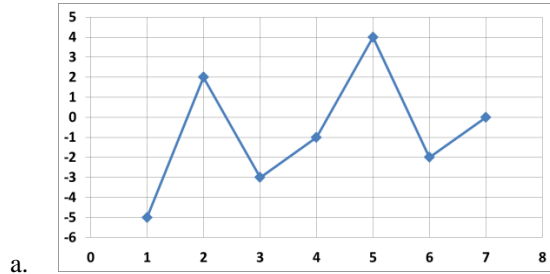
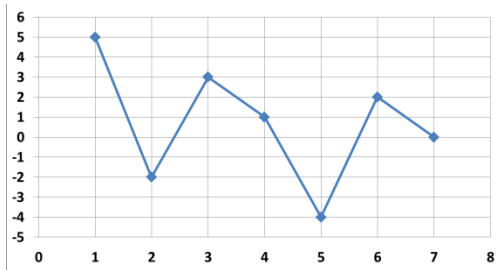


21. In the triangle figure below,  $\angle yxz$  measures  $48^\circ$  and  $\overline{XY} \cong \overline{XZ}$ . What is the measurement of  $\angle xyz$ ?



- a.  $42^\circ$
- b.  $48^\circ$
- c.  $66^\circ$
- d.  $84^\circ$
- e.  $132^\circ$

22. The below graph represents  $y = f(x)$ . Which of the following represents  $y = -f(x)$ ?



23. Five cans of the same size are filled with a liquid at various volumes. The cans are  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{4}{5}$ ,  $\frac{3}{4}$  and  $\frac{7}{10}$  full of liquid respectively. If all the liquid is combined then reallocated such that each can has the same amount of liquid, how full would each can be?

- a.  $\frac{1}{3}$
- b.  $\frac{2}{3}$
- c.  $\frac{2}{5}$
- d.  $\frac{3}{5}$
- e.  $\frac{3}{4}$

24. Which of the following graphs cannot be a graph of  $y = f(x)$ ?

- a.
- b.
- c.
- d.
- e.

25. A cruise leaves the port of Miami headed for the port of Cozumel, Mexico that is 607 miles away. If the cruise takes 1.5 days to reach the destination, what is its average speed to the nearest whole number?

- a.  $16 \frac{\text{miles}}{\text{hour}}$
- b.  $17 \frac{\text{miles}}{\text{hour}}$
- c.  $18 \frac{\text{miles}}{\text{hour}}$
- d.  $40 \frac{\text{miles}}{\text{hour}}$
- e.  $405 \frac{\text{miles}}{\text{hour}}$

26. Chris works for Epic Systems at \$28 per hour the first 40 hours and 1.5 times the regular rate for any additional hours over 40 per week. If Chris was paid \$1,750 for the previous week, how many hours did he work?

- a.  $41 \frac{2}{3}$  hours
- b. 45 hours
- c.  $46 \frac{7}{8}$  hours
- d.  $51 \frac{1}{4}$  hours
- e. 55 hours

27. How many irrational numbers are there between 3 & 4?

- a. 1
- b. 2
- c. 5
- d. 6
- e. Infinitely many

28.  $(-3i^3)^4 = ?$

$(i = \sqrt{-1})$

- a. -12
- b.  $81i$
- c.  $-81i$
- d. 81
- e. -81

29.  $\frac{3}{x} + \frac{x-2}{x+3} = ?$

- a.  $x^2 + x + 9$
- b.  $\frac{x+1}{2x+3}$
- c.  $\frac{x^2-2x}{3x+9}$
- d.  $\frac{3x-6}{x^2+3x}$
- e.  $\frac{x^2+x+9}{x^2+3x}$

30. Which of the following expressions is equal to  $\frac{2+4i}{3-2i}$ ?

- a.  $\frac{14+8i}{5}$
- b.  $\frac{14-8i}{5}$
- c.  $\frac{2-16i}{13}$
- d.  $\frac{-2-16i}{13}$
- e.  $\frac{-2+16i}{13}$

31. If  $5^{x+1} = 7$ , what is the value of  $5^x$ ?

- a.  $\frac{5}{7}$
- b.  $\frac{7}{5}$
- c.  $\frac{7}{2}$
- d.  $\sqrt{7}$
- e. None of the above

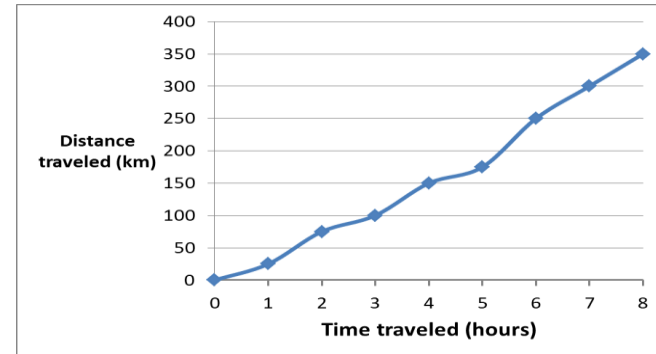
32. If  $x = 4$  and  $y = 3$ , what is the sum of  $2x^2 - 3y^3$  and  $3x^2 - 4y^2$ ?

- a. -29
- b. -37
- c. 17
- d. 101
- e. 143

33. If  $4x + 2 = 2x - 8$ , what is the value of  $x + 3$ ?

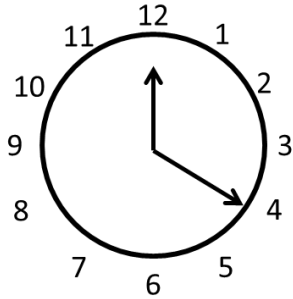
- a. -8
- b. -5
- c. -2
- d. 3
- e. 5

34. Kevin is on a road trip. If the graph below represents the total distance traveled in kilometers over time in hours, what was Kevin's average speed between hours 3 and 6?



- a.  $33\frac{1}{3}$  km/hour
- b.  $41\frac{2}{3}$  km/hour
- c.  $43\frac{3}{4}$  km/hour
- d. 50 km/hour
- e. 60 km/hour

35. An analog clock tells time using an hour hand and minute hand on 12 equally spaced intervals in a circle. The below figure is the clock at 12:20. What is the smaller obtuse angle created by the hour and minute hands?



- a.  $105^\circ$   
 b.  $115^\circ$   
 c.  $120^\circ$   
 d.  $125^\circ$   
 e.  $135^\circ$
36. If  $xy = 40$  &  $x - y = 6$ , what is the value of  $x$ ?
- a. -10 or 4  
 b. -4 or 4  
 c. -4 or 10  
 d. 4  
 e. 10
37. What is the slope of a line perpendicular to  $3x + 4y = 21$ ?
- a.  $-\frac{3}{4}$   
 b.  $-\frac{4}{3}$   
 c.  $-\frac{21}{4}$   
 d.  $\frac{3}{4}$   
 e.  $\frac{4}{3}$
38. What is the  $y$ -intercept of the equation  $3x - 5y = 12$ ?
- a.  $-\frac{12}{5}$   
 b.  $-\frac{5}{3}$   
 c.  $\frac{12}{5}$   
 d.  $\frac{5}{3}$   
 e.  $\frac{3}{5}$
39. If  $\frac{2}{x} < \frac{1}{4}$  where  $x$  is a positive integer, what is the smallest value  $x$  could be?
- a. 1  
 b. 2  
 c. 4  
 d. 8  
 e. 9
40. If  $-8 \leq 3(x + 2) < 10$ , which of the following cannot be a value of  $x$ ?
- a. -2  
 b. 0  
 c.  $\frac{1}{3}$   
 d.  $\frac{5}{4}$   
 e.  $\frac{7}{4}$
41.  $\frac{x+3}{2} - 3y = 9$  is an equation of a line. What is its slope?
- a. -3  
 b.  $-\frac{1}{6}$   
 c.  $-\frac{1}{2}$   
 d.  $\frac{1}{6}$   
 e.  $\frac{1}{2}$



42. If  $2x + 4y = 12$  and  $3x - 2y = 10$ , what is the value of  $x + y$ ?
- 1
  - 4
  - 5
  - 6
  - 9

43. If  $\sqrt{2x} = 10$ , what is the value of  $\sqrt{x}$ ?
- $\sqrt{5}$
  - $5\sqrt{2}$
  - $5\sqrt{5}$
  - 5
  - 20

44. If  $(x - 4)^2 = 0$ , what is the value of  $(x + 4)^2$ ?
- 0
  - 16
  - 32
  - 44
  - 64

45. If  $f(x) = x^2 + 2x$  and  $g(x) = 2x - 4$ , what is  $g(f(3))$ ?
- 2
  - 8
  - 15
  - 26
  - 30

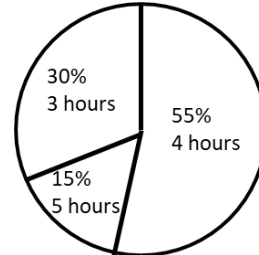
46. If  $f(x) = x^2 + 2x + 5$ , what is the value of  $f(4)$ ?
- 4
  - 16
  - 21
  - 24
  - 29

47. A popular restaurant offers a brunch special that consists of one a soup, salad, entrée & drink. The choices for each item is listed in the below table. How many different brunch special possibilities are there?

Soup	Salad	Entrée	Drink
French onion	Caesar	Chicken & Waffles	Coffee
Broccoli cheddar	Garden	Eggs Benedict	Orange Juice
Tomato		Pancakes	Soda/pop
		Fish Tacos	

- 4
- 12
- 24
- 48
- 72

48. A class of 20 is assigned a project. If the pie chart below is a distribution of hours spent to complete the project by the class, what is the average number of hours spent per student?



- 3.45 hours
- 3.50 hours
- 3.75 hours
- 3.85 hours
- 4.00 hours

49. A 15 pack of pencils costs \$4.99. What is the unit cost of a single pencil to the nearest cent?

- a. 0.03
- b. 0.33
- c. 3
- d. 33
- e. 75

50. If  $a$  equals  $3x - 5$  and  $b$  equals  $5x - 3$ , what is  $a + b$ ?

- a.  $-2x - 8$
- b.  $-2x - 2$
- c.  $2x - 8$
- d.  $8x - 2$
- e.  $8x - 8$

51. If  $f(x) = \sqrt{x + 6}$ , what is the domain of  $f(x)$ ?

- a.  $x \neq -6$
- b.  $x < -6$
- c.  $x \leq -6$
- d.  $x > -6$
- e.  $x \geq -6$

52. What is the greatest common factor of 24, 48, & 108?

- a. 4
- b. 6
- c. 9
- d. 12
- e. 24

53.  $|4 - 7| - |8 - 13| = ?$

- a. -8
- b. -2
- c. 2
- d. 3
- e. 8

54. What is 8% of  $10^3$ ?

- a. 8
- b. 80
- c. 800
- d. 21.6
- e. 216

55. The coordinate (4,1) is the midpoint of line segment  $\overline{AB}$ . If point A is (-2,3), what is the coordinate of B?

- a. (-8, 2)
- b. (8, -2)
- c. (1, 2)
- d. (10, -1)
- e. (10, 1)

56. Which of the following expressions is the equivalent of

$$-2x^6 - 2x^4 + 4x^2 + 6x^2?$$

- a.  $10x^2$
- b.  $10x^4$
- c.  $-2x^6 + 6x^4$
- d.  $-2x^6 - 2x^4 + 10x^2$
- e.  $-2x^2(x^3 - x^2 + 5)$

57.  $(x - 3)^2 + (y + 5)^2 = 9$  is an equation of a circle on the standard  $(x, y)$  coordinate plane. What is the center and radius of the circle?

- a. Center (3, -5) radius 9
- b. Center (-3, 5) radius 9
- c. Center (3, -5) radius 3
- d. Center (-3, 5) radius 3
- e. Center (3, -5) radius 81

58. What is the value of  $\frac{27}{125}$  raised to the power of  $\frac{2}{3}$ ?

- a.  $\frac{1}{3}$
- b.  $\frac{9}{25}$
- c.  $\frac{81}{250}$
- d.  $\frac{25}{9}$
- e.  $\frac{250}{81}$

59. If  $y = \frac{x-3}{x-2}$  where  $x > 2$ , which of the following values cannot be a value of  $y$ ?

- a. -10
- b. -1
- c. 0
- d.  $\frac{1}{2}$
- e. 2

60.  $a$  is a positive integer and  $b$  is a negative integer. If  $|a| > |b|$ , which of the following expressions has the largest value?

- a.  $\left|\frac{a+b}{b}\right|$
- b.  $\left|\frac{a-b}{b}\right|$
- c.  $\left|\frac{a+b}{a}\right|$
- d.  $\left|\frac{a-b}{a}\right|$
- e.  $\left|\frac{b-a}{a}\right|$