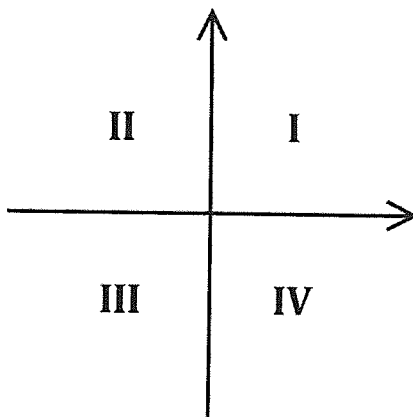


## Mathematics—Module 2

1. If  $\frac{1}{\sqrt[3]{x}} = a$ , what is  $x$ ?

- A)  $a^3$
- B)  $1 - a^3$
- C)  $\frac{1}{a^2}$
- D)  $\frac{1}{a^3}$

2. The graph of the system of inequalities  $y \leq \frac{1}{4}x - 2$  and  $y > 3x - \frac{7}{5}$  has solutions in which quadrants on the  $xy$ -plane below?



- A) Quadrant III only
- B) Quadrants II and III
- C) Quadrants III and IV
- D) Quadrants II, III, and IV

Refer to the following for questions 3 - 4:

Nurseries A, B, and C offer various plants for sale, as well as landscaping services to plant the trees and bushes. Prices are listed in the table below.

	A	B	C
Trees	\$25	\$30	\$20
Bushes	\$15	\$20	\$15
Landscaping (per hour)	\$45	\$55	\$50

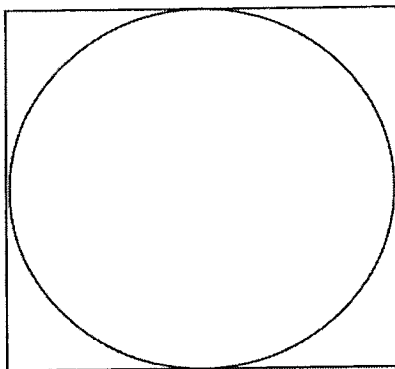
3. Nursery B was hired to plant 100 trees and 100 bushes. If their overhead cost of the plants, equipment, and personnel is \$5,500, how many hours will they have to work to make a profit of \$820?

- A) 15 hours
- B) 21.5 hours
- C) 24 hours
- D) 32.5 hours

4. Isabella plans to hire one of the companies to plant 10 trees and 8 bushes. This project will take  $x$  hours. Which of the following inequalities represents  $x$  if Nursery A offers a better deal than Nursery C?

- A)  $x < 5$
- B)  $x < 10$
- C)  $x > 5$
- D)  $x > 10$

5. A circle is inscribed within a square, as shown. What is the difference between the area of the square and that of the circle, where  $r$  is the radius of the circle?



- A)  $2\pi$
- B)  $\frac{4}{3}\pi r^3$
- C)  $r^2(4 - \pi)$
- D)  $2\pi r$

6. The equation below shows Emma's savings plan. She set aside an initial lump sum and adds to it on a monthly basis. If  $i$  is the total investment in cents and  $m$  is the number of months since she began, how much does she save each month?

$$i = 50,000 + 4,500m$$

- A) \$45
- B) \$500
- C) \$4,500
- D) \$50,000

7. Solve for  $n$  in the equation:  $4n - p = 3r$

- A)  $\frac{3r}{4} - p$
- B)  $p + 3r$
- C)  $p - 3r$
- D)  $\frac{3r}{4} + \frac{p}{4}$

8. If the solution for the system of equations below is  $(x, y)$ , what is the value of  $2x^2 - y$ ?

$$\begin{aligned} 3x - 2y &= 0 \\ -2x + 4y &= -8 \end{aligned}$$

- A) -3
- B) -2
- C) 5
- D) 11

9. What is the  $y$ -coordinate of the center of the circle defined in the equation below?

$$x^2 + y^2 - y - 6x = -\frac{21}{4}$$

10. Riley has several \$5 bills, \$10 bills, and \$20 bills. If she has a total of 9 bills that add up to \$80, what is the greatest number of \$5 bills she could have?

11. Which of the following represents the factored form of the expression  $x^2 - 3x - 40$ ?

- A)  $(x - 8)(x + 5)$
- B)  $(x - 7)(x + 4)$
- C)  $(x + 10)(x - 4)$
- D)  $(x + 6)(x - 9)$

12. A new business is calculating the amount of products that must sell to break even (so that investments equal profits). If  $d$  dollars are invested to produce  $a$  products that can be sold for  $p$  profit, how much investment is required, according to the equations below?

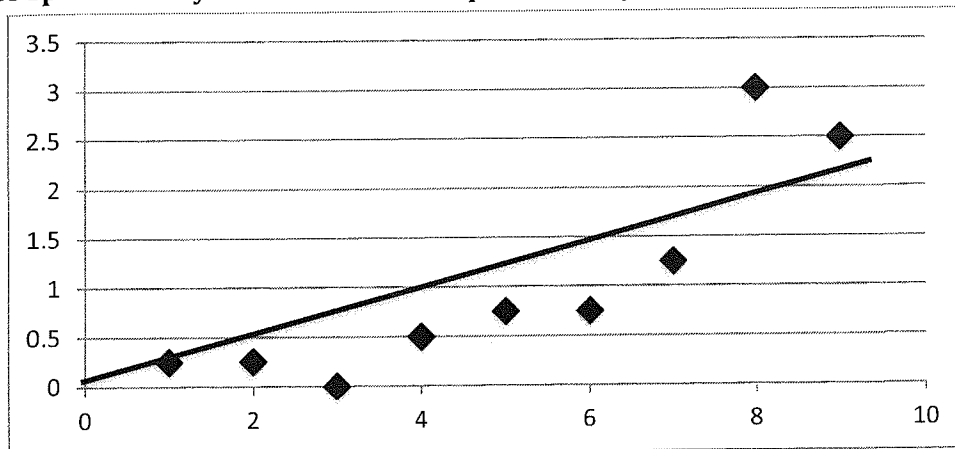
$$\begin{aligned} d &= 9,660 + 1.2a \\ p &= 4a \end{aligned}$$

- A) \$3,450
- B) \$4,140
- C) \$11,260
- D) \$13,800

13. If 3 times the square of a positive number is 48, what is the result when twice the number is subtracted from 15?

- A) -7
- B) 4
- C) 7
- D) 11

14. The scatterplot below shows Zac's time (in hours) on the  $y$ -axis spent working on his science project on the days ( $x$ -axis) leading up to the due date. Approximately how much longer did he spend on Day 8 than the amount predicted by the line of best fit?



- A) 0.5 hours
- B) 1 hour
- C) 2 hours
- D) 3 hours

15. If  $x > 0$  and  $x^2 - 7 = 9$ , what is the value of  $x$ ?

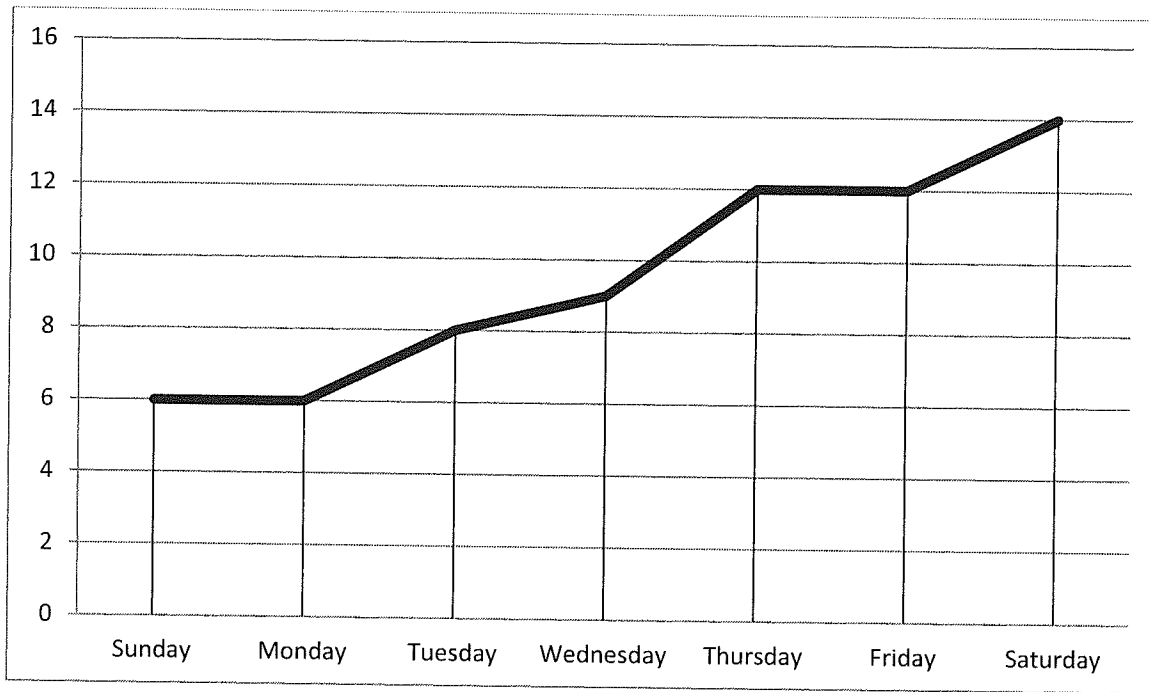
16. If  $\frac{3}{7}q = -6$ , what is the value of  $q$ ?

- A)  $-14$
- B)  $-\frac{18}{7}$
- C)  $-\frac{45}{7}$
- D)  $-42$

17. What is the expanded form of  $(x + 6)(x - 6)$ ?

- A)  $x^2 - 12x - 36$
- B)  $x^2 + 12x - 36$
- C)  $x^2 + 12x + 36$
- D)  $x^2 - 36$

Refer to the following for questions 18 - 19:



Every time Miguel gets quarters in change, he puts them in a jar. The chart above shows how many quarters he has in the jar at the end of each day during a particular week.

**18. How many quarters did Miguel add on Monday?**

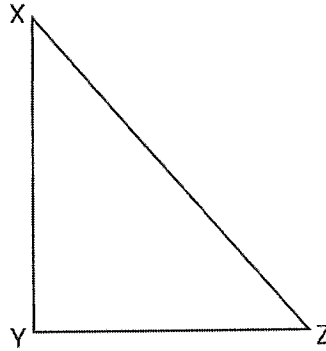
- A) 0
- B) 1
- C) 3
- D) 6

**19. Which day did Miguel add the most quarters to the jar?**

- A) Monday
- B) Tuesday
- C) Thursday
- D) Saturday

**20. The half-life of caffeine in the human body is 5 hours. If Rafe drinks a cup of coffee at 7:00 a.m., what percentage of the caffeine is still in his system at 2:00 p.m.? Round your answer to the nearest whole percent.**

21. In right triangle  $\triangle XYZ$  below, angle  $Z$  measures  $z^\circ$  and  $\sin z^\circ = \frac{4}{5}$ . What is  $\cos(90 - z)^\circ$ ?



22. On line  $WZ$  below,  $WX = XZ$ . What is the length of  $WY$ ? (Note: figure not drawn to scale)

