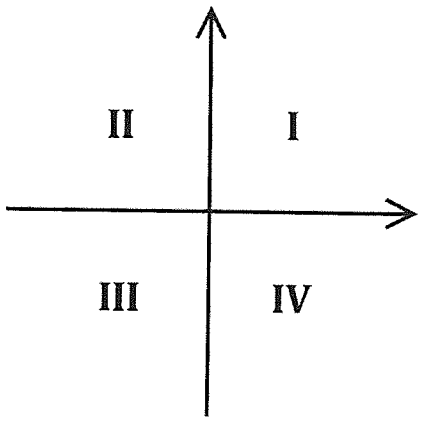
WEEK3.4

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

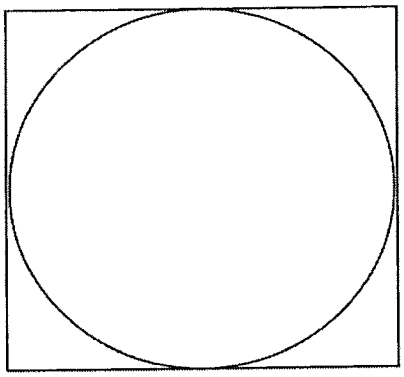
3. Nursery B was hired to plant 100 trees and 100 bushes. If their overhead cost of the plants, equipment, and personnel is $5,500, how many hours will they have to work to make a profit of $820?

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) 2π
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 $2x^2 - y$?

$$3x - 2y = 0$$
$$-2x + 4y = -8$$

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?

$$d = 9,660 + 1.2a$$
$$p = 4a$$

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

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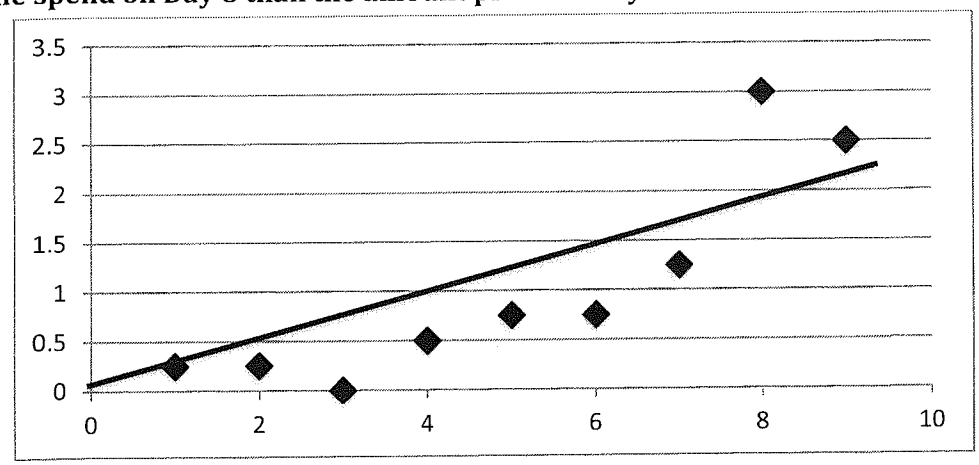
14. The scatterplot below shows Zac's time (in hours) on the y-axis spent working on his science project on the days (x-axis) leading up to the due date. Approximately how much longer did he spend on Day 8 than the amount predicted by the line of best fit?



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?

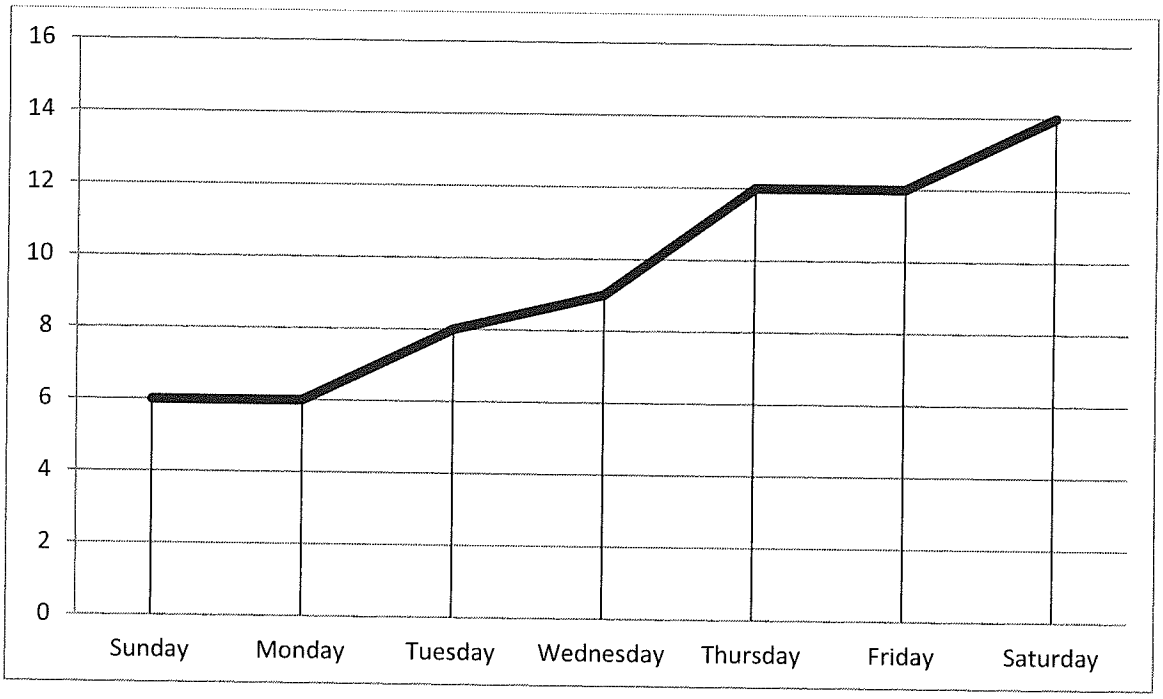
16. If $\frac{3}{7}q = -6$, what is the value of q?

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?

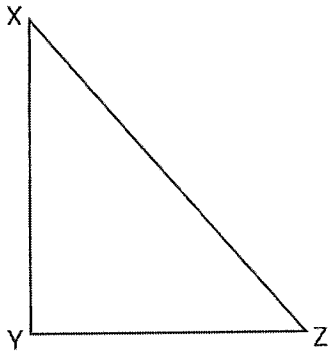
A) 0
B) 1
C) 3
D) 6

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 ΔXYZ below, angle Z measures $z°$ and $\sin z° = \frac{4}{5}$. What is $\cos(90 - z)°$?



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