Note: A calculator is not needed for these questions. An answer key is at the end of the document.

1. Suppose that the amount of money in a bank account triples every 10 years. If \$100 is deposited today, what will its value be after 40 years?

a. \$2,700
b. \$3,000
c. \$8,100
d. 12,000

2. The v-coordinate of the point of intersection of the graph of

b. 26

-x + 4y = -50 and x + y = 20 is

3. The rectangular box shown below has a square base and a closed top. The height is twice the length of one side of the base. Its surface area in terms of x is

c. −14



a. 6

a. 16*x*

b. $8x + 2x^2$ c. $10x^2$

d. $18x^2$

d. -6

4. If 2¹³ is approximately equal to 8,000, then, of the following, which best approximates 2²⁶?

a. 16,000 b. 64,000 c. 64,000,000 d. 8000¹³

5. $2^{-5} \cdot 64^{2/3} =$ a. $2^{\frac{2}{3}}$ b. $\frac{1}{512}$ c. $128^{\frac{-10}{3}}$ d. $\frac{1}{2}$

6. If f is a function whose graph is the parabola sketched below then f(x) < 0 whenever



7. If
$$\log_2(x-6) = 6$$
 then $x =$

a. 70 b. 64 c.58 d. 6 + log₂ 6

8. If
$$\frac{(2x-3)(x+5)}{x-7} = 0$$
, then $x =$
a. 5, 7, $-\frac{3}{2}$ b. 5 or $\frac{3}{2}$ c. -5, 7, or $\frac{3}{2}$ d. -5 or $\frac{3}{2}$

9. If
$$f(x) = \frac{5x+3}{2x+3}$$
, then $f(n+1) =$
a. $\frac{8}{5}$ b. $\frac{5n+3}{2n+3} + 1$ c. $\frac{5n+8}{2n+5}$ d. $\frac{5n+4}{2n+4}$

10. The slope of the line that goes through the points (-5, 4) and (3, -12) is

a.
$$-\frac{1}{2}$$
 b. 8 c. -2 d. 4

11. Find all real-number solutions to the equation $3x^2 = 4x + 1$.

a.
$$\frac{1}{3}, \frac{4}{3}$$
 b. $\frac{2+\sqrt{7}}{3}, \frac{2-\sqrt{7}}{3}$ c. $\frac{-2+\sqrt{7}}{6}, \frac{-2-\sqrt{7}}{6}$ d. no solutions exist

12. In the standard x-y coordinate system, the graph of the equation y = -3x + 7 is

a. a line falling to the right b. a line rising to the right c. a horizontal line d. not a line

13. Find the equation of a line that contains the point (6, 0) and is parallel to the line with equation $y = \frac{1}{2}x - 1$.

a. $y = \frac{1}{2}x + 6$ b. y = -2x + 12 c. $y = \frac{1}{2}x - 3$ d. $y = \frac{1}{2}x + 3$

14. The inequality $|x - 4| \le 8$ is equivalent to

a. $-4 \le x \le 12$ b. $x \le 2$ c. $-12 \le x \le 12$ d. $x \le 12$

15. In the figure shown below, what is the distance between the points *P* and *Q*?



16. The length of a certain rectangle is 6 meters more than twice its width. What is the perimeter of the rectangle if the area of the rectangle is 260 square meters?

a. 36 meters b.72 meters c. 90 meters d. 130 meters

17. The diagram below displays the graph of the function $f(x) = x^3 - x + 7$ and a rectangle whose upperleft corner is on the graph. What is the area of the rectangle?



18. A rectangle *R* has side lengths x and y. A rectangle *S* is formed from *R* by multiplying each of the sides of *R* by 4 (see the figure). What is the area of the portion of *S* lying outside of *R*?



19. If a car uses 1 gallon of gas to go m miles, and gas costs c dollars per gallon, then the cost (in dollars) to drive 1,000 miles is

a. 1,000 <i>mc</i>	ь 1000 <i>с</i>	1000 <i>m</i>	d C
	D m	$C. {c}$	u. $\frac{1,000m}{1,000m}$

20. What is the radian measure of an angle whose degree measure is 240°?

a. 3π b. $\frac{2\pi}{3}$ c. $\frac{8\pi}{3}$ d. $\frac{4\pi}{3}$

21. Find all values of x in the interval $0 \le x \le 2\pi$ that satisfy the equation $(\sin x - 1)(\sin x - 5) = 0$.

a. $\frac{\pi}{2}$ b. π and $\frac{\pi}{5}$ c. $\frac{\pi}{2}$ and $\frac{3\pi}{2}$ d. $0, \pi$, and 2π

22. In the right triangle given below, the interior angle at R is θ . If $\sin\theta = \frac{5}{8}$ and r = 2, then what is q? $r = \frac{16}{5}$ $p = \frac{16}{39}$ $q = \frac{16}{39}$ $q = \frac{16}{39}$ $q = \frac{16}{39}$

23. The graph of a function g passes through the points $(\pi, -\pi)$ and $(\frac{\pi}{3}, \frac{4\pi}{3})$. Which of the following options could be a formula for g?

a. $g(u) = 2u\cos u - \pi$ b. $g(u) = u\cos u$ c. $g(u) = 2u\cos u + \pi$ d. $g(u) = \frac{8\pi\cos u}{3}$

24. Suppose a right triangle has sides x and y and hypotenuse z. If x = 1 and the angle opposite y is α , then $\tan \alpha =$

a.
$$\frac{1}{z}$$
 b. $\sqrt{1-z^2}$ c. $\frac{1}{\sqrt{z^2-1}}$ d. $\sqrt{z^2-1}$

Answer Key

1. c	2. d	3. c	4. c	5. d	6. d	7. a	8. d	9. c	10. c	11. b	12. a
13. c	14. a	15. d	16. b	17. c	18. b	19. b	20. d	21. a	22. a	23. с	24. d