Choose the best answer for each of the following problems.

1. Determine the solution of the system of equations $2x - y = 4$ and $x + 2y = 2$.

$(0, 2)$

$(2, 0)$

$(2, -1)$

$(1, 2)$

2. The population of a certain country is declining at such a rate that the population size is reduced in half every 6 years. If the population is $20,000$ people today, determine the population 24 years from now.

$10,000$

$2,500$

$1,250$

625

3. A rectangular box of length l, width w, and height h has no top. State the outside surface area of this box.

lwh

$lw + 2lh + 2wh$

$4lh + 4wh$

$2(l + w + h)$

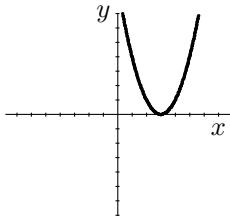**4.** Let $f(x) = x^2 - 4x + 3$. The values of x for which $f(x) \leq 0$ are

$1 \leq x \leq 3$

$-3 \leq x \leq -1$

$0 \leq x \leq 1$

$3 \leq x \leq 5$

5. Which of the following functions is represented by the following graph?

$y = (x + 3)^2$

$y = 3x$

$y = (x - 3)^2$

$y = x^2 - 3$

6. Given that $\log_4(x - 1) = 3$, then $x =$

43

63

65

82

7. Simplify $(81)^{1/4}(64)^{-1/6}$.

-6

$(5184)^{1/12}$

6

$\frac{3}{2}$

8. Assuming 2^{10} is approximately 1000, which of the following best approximates 2^{40}?

4000

10, 000, 000

10^{12}

1000^{30}

9. Definition: An **even function** is a function for which $h(-x) = h(x)$ for all x in the domain of h. Which of the following is an even function?
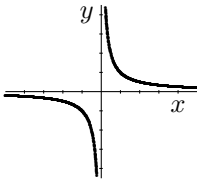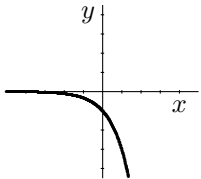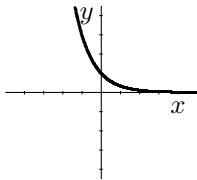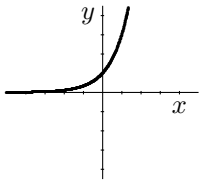
$x^4 + x^2$

$(x + 2)^6$

x^3

$x^5 + 2$

10. Which of the following best represents the graph of $y = 3^{-x}$?

11. Determine the slope of the line that passes through the points $(1, 3)$ and $(-5, -9)$.

-1

$\frac{2}{3}$

$\frac{3}{2}$

2

12. Let $f(x) = -\frac{3}{2}x + 9$. The graph of this function in a standard coordinate system is

a horizontal line

a vertical line

a parabola

none of the above

13. Let $f(x) = x^2 - 25$ and $g(x) = x^2 - 4x - 5$. For what value(s) of x is $\frac{f(x)}{g(x)}$ undefined?

5 and -1

1

5 and -5

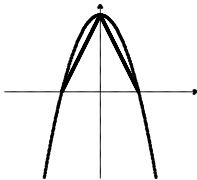**14.** In **fully factored** form, $x^3 + 3x^2 - x - 3 =$

$(x - 1)(x + 1)(x + 3)$

$x^3 + 3x^2 - x - 3$

$(x^2 - 1)(x + 3)$

none of the above

15. Determine the area of the triangle in the following diagram:

Note that the equation of the parabola is $y = -x^2 + 4$. Note also that the base of the triangle lies on the x–axis.

4

8

18

36

16. The perimeter of a square is $\frac{1}{10}$ the magnitude of its area. Find the length of the side of the square.

4

10

40

100

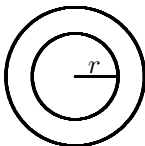**17.** Let $g(x) = \frac{2x+1}{x+3}$. Determine $g(x+4)$.

x

$\frac{11}{7}$

$\frac{2x+5}{x+7}$

$\frac{2x+9}{x+7}$

18. Consider the following diagram:

The radius of the outer circle is exactly 5 times as long as the radius of the inner circle. Determine the area of the region outside the inner circle and inside the outer circle.

πr^2

$4\pi r^2$

$16\pi r^2$

$24\pi r^2$

19. For which of the following values of x is the function $y = \frac{x+9}{\sqrt{x^2-4}}$ undefined?

1

5

9

-9

20. Determine the solution set for the inequality $| \ x + 5 \ | \leq 4$.

$1 \leq x \leq 9$

$x \leq 9$

$-9 \leq x \leq -1$

$-9 \leq x$

21. Which of the following trigonometric functions is **not** defined at $x = \frac{3\pi}{2}$?

$\sin x$

$\cos x$

$\csc x$

$\tan x$

22. Which of the following equals $\frac{\sin \theta \tan \theta \csc^3 \theta}{\sec \theta}$?

$\cos \theta$

$\csc \theta$

$\sin \theta$

None of the above

23. Determine $g\left(\frac{5\pi}{16}\right)$ given that $g(x) = \sin(4x)$.

$\frac{1}{\sqrt{2}}$

$-\frac{1}{\sqrt{2}}$

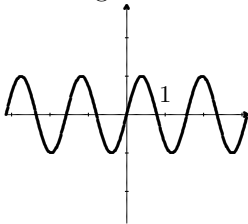$\frac{1}{2}$

$\frac{\sqrt{3}}{2}$

24. $1 - \cos^2 x =$

$\sin^2 x$

1

$\tan^2 x$

$\frac{1}{2}$

25. Which of the following functions is best described by this graph? Note that the values of x range from $-\pi$ to π.

$\sin(2x)$

$\sin(4x)$

$\sin(x)$

$4\sin(x)$

How should you interpret your score?

20 − 25 You appear to be prepared to begin the study of calculus at Cedarville University.

14 − 19 We have some concerns with your readiness to study calculus at Cedarville, but with consistent and diligent study you should be able to complete calculus successfully.

10 − 13 We have serious concerns about your readiness for calculus at Cedarville University. In our calculus classroom you should expect to study approximately 1–2 additional hours a night beyond the expected reading and homework load to complete calculus. We would strongly suggest you begin your college experience with precalculus.

1 − 9 You are not ready for calculus at Cedarville. Moreover, there are some questions about whether you are ready for precalculus. You appear to need additional background in college algebra before beginning the study of precalculus. Feel free to contact Karisa Linafelter at Cedarville University for assistance in choosing an appropriate preparatory course or for advising regarding your choice of major.