CALCULUS READINESS TEST
Suggested time: Entire Test - 30 minutes
Part I - 25 minutes
FORM 1I

Each question is followed by five suggested answers, labeled (A) through (E). Select the one best answer to each question. Do not spend too much time on any one question. Indicate your answers as directed by the test administrator.
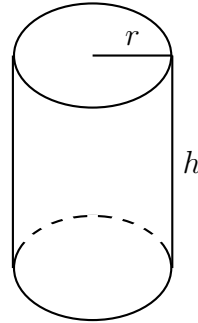**A calculator is not required for any questions on this test.**

Suggested time: Entire Test - 30 minutes
Part I - 25 minutes

PART I
(In all graphing problems, assume the usual coordinate system.)
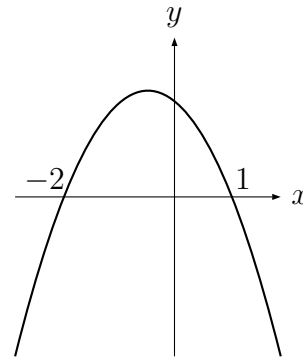
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1. The right circular cylinder shown on the right has a circular base and a closed top. Its surface area in terms of r and h is

(A) $2\pi r^2 + 2\pi rh$

(B) $\pi r^2 + 2\pi rh$

(C) $2\pi r + h$

(D) $4\pi + 2h$

(E) $\pi r^2 h$

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2. If f is a function whose graph is the parabola sketched to the right, then $f(x) > 0$ whenever

(A) $x < 0$

(B) $x > -2$

(C) $x < 1$

(D) $x < -2$ or $x > 1$

(E) $-2 < x < 1$

3. Money in a bank quadruples every 8 years. If $100 is deposited today, what will its value be after 24 years?

(A) $6,700   (B) $6,400   (C) $1,500   (D) $1,200   (E) $300

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4. The y-coordinate of the point of intersection of the graphs of $x - 2y = -18$ and $x + y = -9$ is

(A) -3 (B) 0   (C) 3   (D) 6   (E) 9

5. Definition: A function f is odd if $f(-x) = -f(x)$ for each x in the domain of f.

Of the following, which best represents the graph of an odd function?

(A) y (B) y (C) y

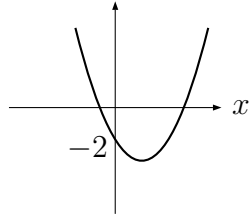
(D) y (E) y
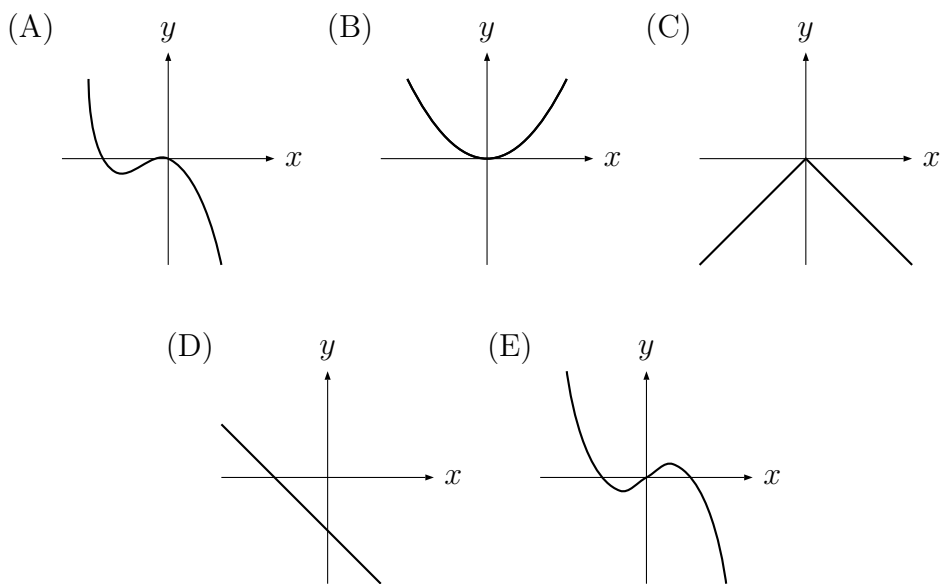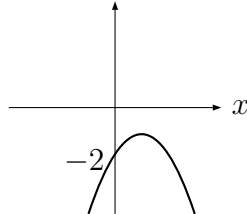

6. $(25)^{1/2}(27)^{-1/3} =$

(A) 15   (B) $\dfrac{5}{3}$ (C) $\dfrac{3}{5}$ (D) $(675)^{-1/6}$ (E) -15

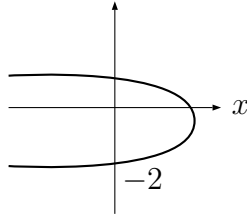7. Of the following, which best represents the graph of $y = x^2 - 2x - 2$?
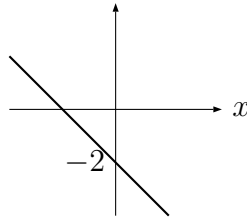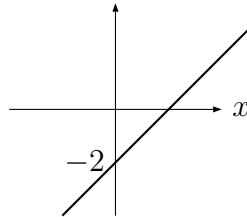
(A)

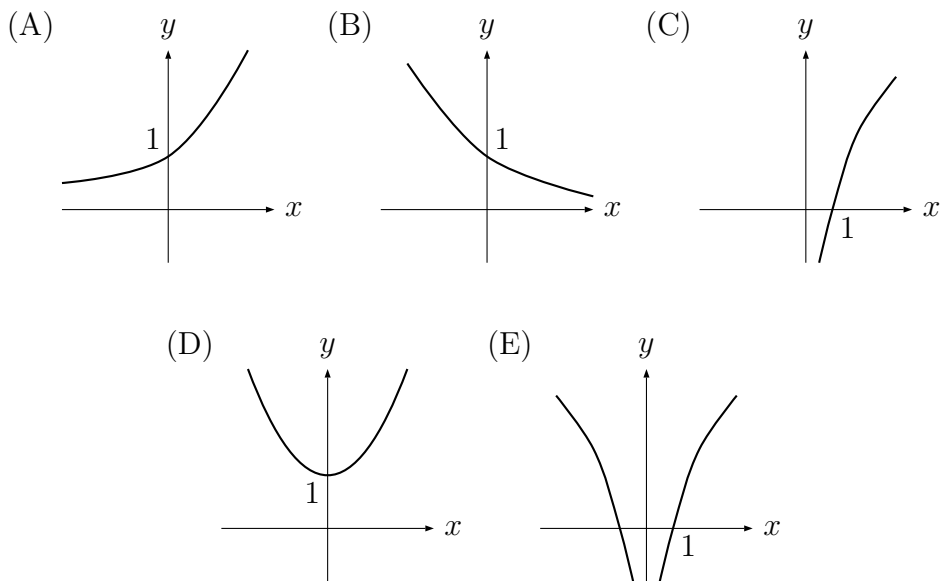(B)

(C)

(D)

(E)

8. If $\log_4(x + 9) = 3$ then $x =$

(A) 3   (B) 12   (C) 21   (D) 55   (E) $\dfrac{3}{\log_4 3}$

9. Of the following, which best represents the graph of $y = 5^x$?

(A)

(B)

(C)

(D)

(E)

10. If $\dfrac{(2x + 1)(x - 5)}{x + 3} = 0$ then $x =$

(A) -5 or $\dfrac{1}{2}$

(B) -5, 3 or $\dfrac{1}{2}$

(C) 5 or $-\dfrac{1}{2}$

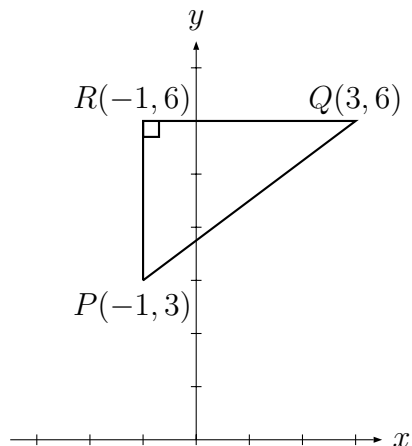(D) 5, -3 or $-\dfrac{1}{2}$

(E) 5 or -3

11. Since 3^7 is approximately equal to 2000, of the following, which best approximates 3^{14}?

(A) 4,000   (B) 40,000   (C) 400,000   (D) 4,000,000   (E) 2000^7

12. In the figure shown to the right, what is the distance between the points P and Q?

(A) 4

(B) 5

(C) 7

(D) 8

(E) 11

$R(-1,6)$ $Q(3,6)$

$P(-1,3)$

13. If $f(x) = \dfrac{5x+3}{x+5}$ then $f(c+2) =$
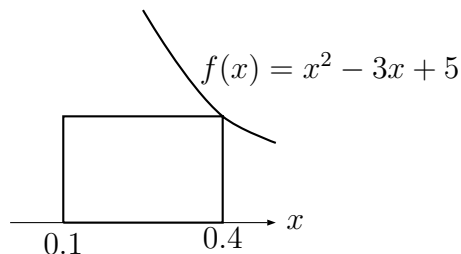
(A) $\dfrac{13}{7}$ (B) $\dfrac{5c+3}{c+5}$ (C) $\dfrac{5c+3}{c+7}$ (D) $\dfrac{5c+5}{c+7}$ (E) $\dfrac{5c+13}{c+7}$

14. In a standard coordinate system, the graph of the equation $y = -3x + 6$ is

(A) not a line.

(B) a vertical line.

(C) a horizontal line.

(D) a line rising to the right.

(E) a line falling to the right.

15. What is the area of the rectangle shown in the figure to the right?
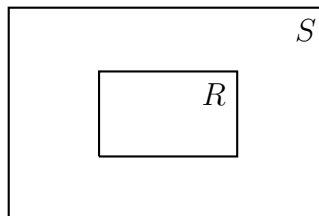
Note: The figure is not drawn to scale.

$$f(x) = x^2 - 3x + 5$$

0.1   0.4 x

(A) 0.04   (B) 0.1188   (C) 0.3   (D) 1.188   (E) 3.96

16. The quantity $p - q$ is a factor of how many of the following?

$$p^2 - q^2 \qquad p^2 + q^2 \qquad p^3 - q^3 \qquad p^3 + q^3$$

(A) none   (B) one only   (C) two only   (D) three only   (E) four

17. A rectangle R has width x and length y. A rectangle S is formed from R by multiplying each of the sides of the rectangle R by 3 as shown in the figure to the right. What is the area of the portion of S lying outside R?

S

R

Note: The figure is not drawn to scale.

(A) 9xy   (B) 8xy   (C) 3xy   (D) xy   (E) $x^3 y^3$

7

18. The inequality $|x - 7| \leq 2$ is equivalent to

(A) $5 \leq x \leq 9$

(B) $-9 \leq x \leq -5$

(C) $-9 \leq x \leq 9$

(D) $x \leq 5$

(E) $x \leq 9$

19. The length of a certain rectangle is 3 meters more than twice its width. What is the width of the rectangle if the perimeter of the rectangle is 90 meters?

(A) 6m   (B) 12m   (C) 14m   (D) 16m   (E) 29m

20. Definition: A function f has a maximum value at c if $f(c) \leq f(x)$ for every x in the domain of f.

The domain of the function whose graph is shown to the right is [0,5]. At which of the following numbers does the function appear to have a maximum value?
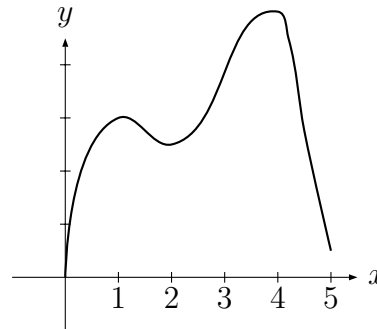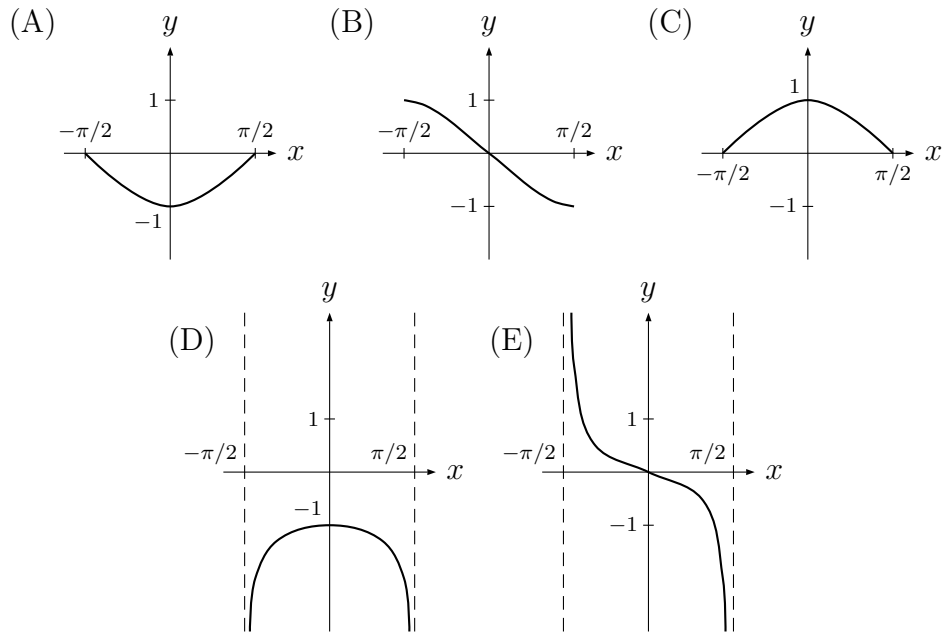

(A) 1   (B) 2   (C) 3   (D) 4   (E) 5

END OF PART I

PART II
(Assume radian measure in all trigonometric expressions.)

21. Of the following, which best represents the graph of $y = \cos x$ for x between $-\dfrac{\pi}{2}$ and $\dfrac{\pi}{2}$?

(A)

(B)

(C)

(D)

(E)

22. $\cos^2 \theta - 1 =$

(A) $-\sin \theta$ (B) $\cos 2\theta$ (C) $-\sin^2 \theta$ (D) $\sin^2 \theta$ (E) $-\sec^2 \theta$

23. If $f(x) = \cos(3x)$ then $f\left(\dfrac{\pi}{6}\right) =$

(A) 1   (B) $\dfrac{\sqrt{3}}{2}$ (C) $\dfrac{1}{\sqrt{2}}$ (D) $\dfrac{1}{2}$ (E) 0

24. For which of the following values of x is $\csc x$ not defined?

(A) $-\pi$ (B) $-\dfrac{\pi}{3}$ (C) $\dfrac{\pi}{6}$ (D) $\dfrac{\pi}{4}$ (E) $\dfrac{\pi}{2}$

25. $\sec^2 \theta \cot \theta \cos \theta =$

(A) $\sec \theta$ (B) $\csc \theta$ (C) $\sin \theta$ (D) $\cos \theta$ (E) $\cot \theta$

END OF PART II