

PRECALCULUS-CALCULUS

READINESS EXAMINATION

Test # 1

1. When $a = -2$, $b = 3$, and $c = 4$, the value of the expression $\frac{b^2 - c}{a^2 - b^2}$ is
- (a) 1 (b) -1 (c) $-\frac{5}{13}$ (d) $\frac{5}{13}$
(e) None of the above.
2. The expression $(-3b)(-2a^2b)^2$ simplifies to
- (a) $-12a^4b^3$ (b) $36a^4b^4$ (c) $12a^4b^3$ (d) $6a^2b^2$
(e) None of the above.
3. The expression $6x^2 - 7[-2x^3 - 6(3x^3 - 1)]$ simplifies to
- (a) $112x^3 - 6x^2 - 42$ (b) $140x^3 + 6x^2 - 42$ (c) $-140x^3 + 6x^2 + 42$
(d) $-112x^3 + 6x^2 - 42$ (e) None of the above.
4. If $3(x + 2) + x = 4\left(1 - \frac{1}{2}x\right)$, then x is
- (a) $-\frac{1}{2}$ (b) $-\frac{1}{3}$ (c) 0 (d) -1
(e) None of the above.
5. The expression $\frac{\sqrt{x} \cdot \sqrt[3]{x}}{\sqrt[4]{x}}$ simplifies to
- (a) x (b) $x^{29/6}$ (c) x^{-1} (d) $x^{7/12}$
(e) None of the above.

6. The quotient $\frac{\frac{1}{x+h} - \frac{1}{x}}{h}$ simplifies to
- (a) $\frac{1}{h^2}$ (b) $\frac{-h^2}{(x+h)x}$ (c) $-\frac{1}{x(x+h)}$ (d) $\frac{1}{x(x+h)}$
 (e) None of the above.
7. If $-6x + 1 < 2$, then
- (a) $x > -\frac{1}{6}$ (b) $x > -\frac{1}{2}$ (c) $x < -\frac{1}{6}$ (d) $x < -\frac{2}{5}$
 (e) None of the above.
8. If $\frac{7}{5x-6} = \frac{1}{x-1}$, then x is
- (a) $\frac{1}{12}$ (b) $\frac{1}{2}$ (c) $-\frac{5}{2}$ (d) $-\frac{13}{2}$
 (e) None of the above.
9. The quadratic expression $x^2 - 19x + 84$ factors as
- (a) $(x-12)(x-7)$ (b) $(x+12)(x+7)$ (c) $(x-21)(x-4)$
 (d) $(x-28)(x-3)$ (e) None of the above.
10. The expression $\frac{4x-5}{x^2-3x+2} - \frac{3}{x-2}$ simplifies to
- (a) $\frac{3}{x-1}$ (b) $\frac{x-8}{(x-2)(x+1)}$ (c) $\frac{1}{x-1}$ (d) $\frac{x-8}{(x-2)(x-1)}$
 (e) None of the above.
11. The polynomial $24x - 14x^2 - 3x^3$ can be factored as
- (a) $-x(x+6)(3x-4)$ (b) $-3x(x+4)(x-2)$ (c) $-x(3x-8)(x+3)$
 (d) $-x(x-6)(3x+4)$ (e) None of the above.

12. The expression $\frac{x^2 - 9}{x + 3} \cdot \frac{2x - 6}{x^2 - 6x + 9}$ simplifies to

- (a) 1 (b) $\frac{1}{3x}$ (c) $\frac{2}{x + 3}$ (d) 2
(e) None of the above.

13. The quadratic equation $x^2 - x - 7 = 0$ is satisfied when x is

- (a) $1 \pm 2\sqrt{2}$ (b) $\frac{1}{2}(1 \pm 2\sqrt{2})$ (c) $\frac{1}{2}(1 \pm \sqrt{29})$ (d) $\frac{1}{2}(-1 \pm \sqrt{29})$
(e) None of the above.

14. If $|x - 3| \leq 4$, then

- (a) $1 \leq x \leq 7$ (b) $-7 \leq x \leq -1$ (c) $-1 \leq x \leq 7$ (d) $-7 \leq x \leq 1$
(e) None of the above.

15. One factor of $25y^{16} - 4x^2$ is

- (a) $5y^8 + 4x$ (b) $5y^{12} - 2x$ (c) $5y^4 + 2x$ (d) $5y^8 - 2x$
(e) None of the above.

16. The inequality $(2x - 3)(x - 4) < 0$ is satisfied when

- (a) $\frac{3}{2} < x < 4$ (b) $x > 4$ only (c) $x < \frac{3}{2}$ only (d) $x < \frac{3}{2}$ or $x > 4$
(e) None of the above.

17. The expression $\left(\frac{x^8 y^{-4}}{z^{-8}}\right)^{-\frac{3}{4}}$ is equivalent to

- (a) $x^6 y^3 z^{-6}$ (b) $x^{-6} y^{-3} z^6$ (c) $x^{-6} y^3 z^6$ (d) $x^{-6} y^3 z^{-6}$
(e) None of the above.

18. The slope of the line with equation $4x + 3 = y - 2$ is

- (a) $\frac{4}{5}$ (b) $\frac{4}{3}$ (c) $-\frac{4}{3}$ (d) 4
(e) None of the above.

19. A line with slope 2 and y -intercept 3 has the equation

- (a) $y = 3x + 2$ (b) $x = 2y + 3$ (c) $y = 2x + 3$ (d) $x = 3y + 2$
(e) None of the above.

20. If (x, y) satisfies both of the equations $2x + 3y = 7$ and $2x - 3y = 4$, then x is

- (a) $\frac{3}{4}$ (b) 5 (c) $\frac{5}{4}$ (d) $\frac{11}{4}$
(e) None of the above.

21. If $f(x) = 2 - 3x$, then $f(x - 1) + f(x) - 1$ is

- (a) $2 - 6x$ (b) $-6x$ (c) $6 - 6x$ (d) $8 - 6x$
(e) None of the above.

22. The largest set of real numbers in the domain of the function $f(x) = \frac{1}{\sqrt{3-x}}$ is

- (a) $x < 3$ (b) $x \leq 3$ (c) $x < -3$ (d) $x \leq -3$
(e) None of the above.

23. If $f(x) = 3x - 5$ and $g(x) = 2x^2$, then the composition $(f \circ g)(x) \equiv f(g(x))$ is

- (a) $6x^2 - 5$ (b) $2x^2 - 5$ (c) $18x^2 - 60x + 50$ (d) $6x^3 - 10x^2$
(e) None of the above.

24. The equation $\frac{x^2 - 3x + 2}{x - 1} + 2x = 4$ is satisfied when x is
- (a) 1 or 2 (b) $\frac{2}{3}$ only (c) 2 only (d) -1 or $\frac{2}{3}$
(e) None of the above.

25. The expression $\frac{(1-x)(x+2) + (x+2)^2}{(1-x)(x+2)}$ simplifies to
- (a) $x^2 + 4x + 4$ (b) $x^2 + 4x + 5$ (c) $x + 3$ (d) $\frac{3}{1-x}$
(e) None of the above.

26. The distance between the points $P(3, 8)$ and $Q(-5, 2)$ is
- (a) 14 (b) 18 (c) $2\sqrt{10}$ (d) 10
(e) None of the above.

27. For positive real numbers m , n , and r , which of the following are true?

- I. $\log(mn) = \log m + \log n$
II. $\log\left(\frac{m}{n}\right) = \frac{\log m}{\log n}$
III. $\log(m^r) = r \log m$

- (a) I, II, and III (b) I and II (c) I and III (d) II and III
(e) None of the above.

28. Suppose that 3^8 is approximately 7,000. Which of the following best approximates 3^{16} ?
- (a) $(7,000)^8$ (b) 490,000 (c) 14,000 (d) 49,000,000
(e) None of the above.

- 29.** A rectangle has a length that is 6 meters more than its width. What is the width of the rectangle if the perimeter of the rectangle is 156 meters?
- (a) 36 meters (b) 42 meters (c) 75 meters (d) $-3 + \sqrt{165}$ meters
 (e) None of the above.
- 30.** The volume of a sphere is proportional to the cube of its radius. Suppose the sphere S has a radius that is twice the radius of the sphere C and that the volume of C is V . Then the volume of S is
- (a) $2V$ (b) $3V$ (c) $6V$ (d) $8V$
 (e) None of the above.
- 31.** The graph of $y = \cos \frac{1}{3}x$, for x in the interval $[0, 3\pi]$, crosses the x -axis at
- (a) $0, \frac{3\pi}{2}$, and 3π (b) 0 and 3π (c) $\frac{3\pi}{2}$ only (d) 0 only
 (e) None of the above.
- 32.** When the expression $\frac{1}{\tan t + \cot t}$ is defined, it is equivalent to
- (a) 1 (b) $\frac{1}{\sin t \cos t}$ (c) $\sin t \cos t$ (d) $\frac{\sin t \cos t}{\sin t + \cos t}$
 (e) None of the above.
- 33.** The solutions of the equation $2 \cos x - \sqrt{3} = 0$ that lie in the interval $[0, 2\pi]$ are
- (a) $\frac{\pi}{6}$ and $\frac{11\pi}{6}$ (b) $\frac{\pi}{6}$ and $\frac{5\pi}{6}$ (c) $\frac{\pi}{3}$ and $\frac{5\pi}{3}$ (d) $\frac{\pi}{3}$ and $\frac{2\pi}{3}$
 (e) None of the above.
- 34.** The value of $\sin(t - \pi)$ is the same as the value of
- (a) $-\sin t$ (b) $\sin t$ (c) $-\cos t$ (d) $\cos t$
 (e) None of the above.

- 35.** An open rectangular box has height h and a square base with a perimeter $4x$. The surface area of the box is
- (a) x^2h (b) $4x + h$ (c) $2x^2 + 4xh$ (d) $x^2 + 4xh$
(e) None of the above.
- 36.** In an isosceles right triangle two sides have length 5. The length of the hypotenuse is
- (a) $\sqrt{10}$ (b) $\frac{5\sqrt{3}}{2}$ (c) $5\sqrt{2}$ (d) $5\sqrt{3}$
(e) None of the above.
- 37.** An angle of $\frac{7\pi}{3}$ radians is the same as an angle of
- (a) 180° (b) 420° (c) 240° (d) 30°
(e) None of the above.
- 38.** A rectangle R has width x and length y . A new rectangle S is formed from R by multiplying all the sides of R by 6. How much more area does S have than R ?
- (a) $5xy$ (b) $6xy$ (c) $35xy$ (d) $36xy$
(e) None of the above.
- 39.** The equation $x^2 + y^2 + 6x - 2y - 15 = 0$ describes a circle with
- (a) center $(-3, 1)$ and radius 5 (b) center $(3, -1)$ and radius 5
(c) center $(-3, 1)$ and radius 25 (d) center $(3, -1)$ and radius 25
(e) None of the above.
- 40.** The graph of the equation $y = \frac{2x}{x^2 - 2}$ has a vertical asymptote whose equation is
- (a) $y = 2$ (b) $x = -\sqrt{2}$ (c) $y = \sqrt{2}$ (d) $x = 2$
(e) None of the above.