

THIS PLACEMENT TEST IS ONLY FOR:

- ✓ Architecture/Interior Design majors
- ✓ Computer Science majors
- ✓ All Engineering majors
- ✓ Environmental Science/Biology/Chemistry majors
- ✓ Mathematics majors

INSTRUCTIONS:

- ✓ The test consists of 30 multiple choice questions.
- ✓ Only basic scientific calculators are allowed. Graphing calculators are not allowed.
- ✓ Allowed time is 90 minutes (around three minutes per question).

1. $\frac{\frac{y}{x} - \frac{x}{y}}{y - x}$ is equal to:

(a) $\frac{y + x}{xy}$

(b) $\frac{y - x}{xy}$

(c) $\frac{y + x}{x^2}$

(d) $\frac{y + x}{y^2}$

(e) None of the above.

2. The solution of $\frac{1}{x + 1} + \frac{x}{x - 1} = \frac{2}{x^2 - 1}$ is:

(a) $-3, 1$

(b) -3

(c) $1, 3$

(d) $2, -2$

(e) None of the above.

3. If $x > 0$, then $\frac{\sqrt[4]{x^5} \sqrt[3]{x^2}}{\sqrt{x^3}}$ equals

(a) x

(b) $x^{5/12}$

(c) $x^{11/12}$

(d) $x^{-11/12}$

(e) None of the above

4. The solution for $\frac{x - 1}{x - 2} < 0$ is

(a) $(1, 2)$

(b) $(1, 2]$

(c) $[1, 2]$

(d) $(2, \infty)$

(e) None of the above

5. The following lines $2x - y = 1$ and $x + 2y = 2$ are

- (a) parallel
- (b) Perpendicular
- (c) Neither parallel nor perpendicular
- (d) They intersect at the point (2,1)
- (e) None of the above

6. $(x + 8)^2 - 16$ is equal to:

- (a) $(x + 12)(x + 4)$
- (b) $(x + 12)(x - 4)$
- (c) $(x - 4)(x + 4)$
- (d) $(x + 24)(x - 8)$
- (e) None of the above

7. If $f(x) = 2/(x - 4)$ and $g(x) = x^2 - 1$ then

- (a) $f(g(x)) = \frac{-4}{(x - 4)^2}$
- (b) $f(g(x)) = \frac{2}{x^2 + 5}$
- (c) $f(g(x)) = \frac{4}{(x - 4)^2} - 1$
- (d) $f(g(x)) = \frac{2}{x^2 - 5}$
- (e) None of the above

8. $\frac{x - y}{\sqrt{x} + \sqrt{y}}, x > 0, y > 0$ is equal to:

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

9. If $f(x) = \frac{x}{x+1}$ for $x \neq -1$, then

(a) $f^{-1}(x) = \frac{x}{x+1}$

(b) $f^{-1}(x) = \frac{-x}{x+1}$

(c) $f^{-1}(x) = \frac{x}{1-x}$

(d) $f^{-1}(x) = \frac{1}{x+1}$

(e) $f^{-1}(x) = \frac{x+1}{x}$

10. Let $f(x) = \sqrt{x-4} + \sqrt{7-x}$. Then the domain of f is

(a) $[5, \infty)$

(b) $(0, \infty)$

(c) $[4, 7]$

(d) $[7, \infty)$

(e) None of the above

11. $\frac{1}{x^2-4} + \frac{3}{x^2-5x+6}$ is equal to

(a) $\frac{4x+3}{(x-2)(x+2)(x-3)}$.

(b) $\frac{4}{(x-2)(x+2)(x-3)}$.

(c) $\frac{4x}{(x-2)(x+2)(x-3)}$

(d) $\frac{4x+9}{(x-2)(x+2)(x+3)}$.

(e) None of the above

12. $\frac{(x^2y^4)^5 (x^3y)^{-3}}{xy}$ is equal to
- (a) $x y^{16}$
 - (b) y^{16}
 - (c) $\frac{x}{y^3}$
 - (d) $\frac{1}{x^{20}y^3}$
 - (e) None of the above
13. The completion of square of the expression $x^2 + 6x + 5$ is
- (a) $(x + 3)^2 - 4$
 - (b) $(x + 3)^2 + 4$
 - (c) $(x - 3)^2 + 4$
 - (d) $(x + 3)^2 - 1$
 - (e) None of the above
14. If $\ln(y^2 - 1) - \ln(y - 1) = \ln(x + 1)$ then
- (a) $y = e^x$
 - (b) $y = x$
 - (c) $y = 1 + x$
 - (d) $y = \frac{1 + x}{1 - x}$
 - (e) None of the above
15. The solution of $|2x - 1| = 1 - x$ is
- (a) $x = 0, 1$
 - (b) $x = -1, -2$
 - (c) $x = 0, -1/2$
 - (d) $x = 4$
 - (e) None of the above

16. If $e^{2x} - 2e^x - 3 = 0$ then

- (a) $x = \ln(3)$
- (b) $x = e^2$
- (c) $x = \ln(2)$
- (d) $x = e^3$
- (e) None of the above

17. $\cos^2(\pi + \theta) + \sin^2(\pi + \theta)$ is equal to

- (a) 0
- (b) 1
- (c) $\pi + \theta$
- (d) π
- (e) None of the above

18. The solution of $|2x - 3| \geq 5$ is:

- (a) $(-\infty, -1] \cup [4, +\infty)$
- (b) $[-1, 4]$
- (c) $(-\infty, 4] \cup [1, \infty)$
- (d) $[3, 5]$
- (e) None of the above

19. For $x > 0$, $y > 0$ and $z > 0$, $\ln\left(\frac{x^2 y^4}{z^5}\right)$ is equal to

- (a) $2\ln x + \ln y - \ln(z)$
- (b) $(\ln x)(\ln y)(5 \ln z)$
- (c) $2 \ln x + 4 \ln y - 5 \ln z$
- (d) $(2 \ln x)(4 \ln y)(5 \ln z)$
- (e) None of the above

20. If $x > 0, y > 0$, then $e^{2\ln x - \ln y}$ is equal to

- (a) $\frac{x^2}{y}$.
- (b) e^{xy} .
- (c) $x^2 y$
- (d) x/y .
- (e) None of the above

21. $\sqrt[3]{27x^{15}y^4}$ is equal to

- (a) $9x^3y\sqrt[3]{y}$
- (b) $3x^3y\sqrt[3]{y}$
- (c) $9x^5y\sqrt[3]{y}$
- (d) $3x^5y\sqrt[3]{y}$
- (e) None of the above

22. $\frac{\sin(x)\cos(x)}{\sin(2x)}$ is equal to:

- (a) -1
- (b) $1/2$
- (c) $\cos(x)$
- (d) $\sin(2x)$
- (e) None of the above

23. The parabola $y = -2x^2 + 4x + 1$ has vertex at the point:

- (a) $(-1, 3)$
- (b) $(1, -5)$
- (c) $(1, 3)$
- (d) $(-1, -5)$
- (e) None of the above

24. If $f(x) = x^2 - kx - 3$ and $f(2) = 9$, then $k =$:

- (a) 4
- (b) -5
- (c) 2
- (d) -4
- (e) None of the above

25. Knowing that $\sin \alpha = 3/7$, and $\pi/2 < \alpha < \pi$, then $\tan \alpha$ is equal to:

- (a) $\frac{3}{\sqrt{40}}$
- (b) $\frac{-3}{\sqrt{40}}$
- (c) $\frac{\sqrt{5}}{2}$
- (d) $-\frac{\sqrt{5}}{2}$
- (e) None of the above.

26. $\frac{(x+1)^3 + 8}{x+3}$ is equal to:

- (a) $x^2 + 3$
- (b) $x^2 - 3$
- (c) $x^2 + 4x + 7$
- (d) $(x-1)^2$
- (e) None of the above

27. The solution of $\tan(x + \pi) = 0$, $0 \leq x \leq 2\pi$ is equal to:

- (a) 0
- (b) $0, \pi$
- (c) $0, \pi, 2\pi$
- (d) 2π
- (e) None of the above

28. Let $f(x) = \ln(4x - 3)$, then the domain of $f(x)$ is:

- (a) $(\frac{3}{4}, 1)$
- (b) $(0, \infty)$
- (c) $(-\infty, \infty)$
- (d) $[-\frac{3}{4}, \infty)$
- (e) None of the above

29. Let $f(x) = 2 \cos x$, then the range of $f(x)$ is:

- (a) All real numbers.
- (b) $(-1, 1)$
- (c) $[-2, +\infty)$
- (d) $(-1, 2]$.
- (e) None of the above.

30. The domain of $\sqrt{x^2 + x - 6}$ is:

- (a) $(-\infty, -3] \cup [2, \infty)$
- (b) $[0, \infty)$
- (c) $[-5, 1]$
- (d) $[1, \infty)$
- (e) None of the above.