

**THIS PLACEMENT TEST IS ONLY FOR:**

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

**INSTRUCTIONS:**

- ✓ The test consists of 30 multiple choice questions.
- ✓ All types of calculators are NOT allowed
- ✓ Duration of the exam is 90 minutes (around three minutes per question).

1.  $\frac{\frac{y-x}{x}-\frac{x}{y}}{y-x}$  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)  $\pi$
  - (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  $z > 0$ ,  $\ln\left(\frac{x^2y^4}{z^5}\right)$  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)  $2\pi$
  - (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.

### Answer Key

Question Number	Solution
1	A
2	B
3	B
4	A
5	B
6	A
7	D
8	D
9	C
10	C
11	A
12	B
13	A
14	B
15	E
16	A
17	B
18	A
19	C
20	A
21	D
22	B
23	C
24	D
25	B
26	A
27	C
28	E
29	E
30	A