

Montclair State University (MSU), Department of Mathematical Sciences

MSU Mathematics Placement Test

Sample Problems for Intermediate Algebra

Answers to the following sample questions are given below. (You will have 45 minutes to do 25 problems on the actual test.)

- $8^{2/3} =$
(a) $\frac{16}{3}$ (b) $\frac{64}{3}$ (c) 2 (d) 4
- $(x - 2)^2 =$
(a) $x^2 - 4$ (b) $x^2 + 4$ (c) $x^2 - 4x + 4$ (d) $x^2 + 4x + 4$
- What is the equation of a straight line passing through $(3, 2)$ with a slope of 4?
(a) $y = 3x + 4$ (b) $y = 4x - 10$ (c) $3x + 2y = 4$ (d) $4x + 3y = 2$
- If $a > 0$ and $b > 0$, then $3(a^0b^2) =$
(a) $3b^2$ (b) 3 (c) 1 (d) $3ab^2$
- The graph of $x^2 - y^2 = 10$
(a) a circle (b) an ellipse (c) a hyperbola (d) a parabola
- The time in hours to travel 30 miles at $x - 1$ miles per hour is
(a) $\frac{30}{x - 1}$ (b) $\frac{x - 1}{30}$ (c) $30(x - 1)$ (d) $30x - 1$
- Translate into mathematical equation: "3 is divided by 4 less than a number x and the result is 12"
(a) $\frac{4 - x}{3}$ (b) $\frac{3}{4 - x}$ (c) $\frac{x}{3} - 4 = 12$ (d) $\frac{3}{x - 4} = 12$
- $\sqrt{5} + \sqrt{20} =$
(a) $2\sqrt{5}$ (b) 5 (c) $3\sqrt{5}$ (d) 10
- Evaluate $ac^2 + a^3b$ if $a = 2$, $b = 3$, and $c = 4$
(a) 27 (b) 32 (c) 49 (d) 56
- If $y = x^2 + 2x + k$ passes through the point $(1, 2)$, then $k =$
(a) 1 (b) -1 (c) 2 (d) -2

11. Translate into a mathematical equation:
 “3 more than some number x is 2 more than 4 times that number.”
- (a) $2 + x = 3 + 4x$ (b) $4x + 2 = x + 3$ (c) $3 + x = 2 - 4x$ (d) $3 + x = 4x - 2$
12. The points of intersection of the graphs of $y = x^3 - 4x^2 - 16x$ and $y = 5x$ are:
- (a) $(0, 0)$ and $(7, -3)$ (b) $(5, -7)$ and $(5, 3)$ (c) $(7, 5)$ and $(-3, 5)$
 (d) $(0, 0)$, $(-3, -15)$, and $(7, 35)$
13. If $f(x) = 1 + 3x^2$, where $x \neq 0$, then $\frac{f(x+2) - f(2)}{x} =$
- (a) $\frac{1 + 3x^2}{x}$ (b) $3x + 12$ (c) 15 (d) 1
14. The domain of the function $f(x) = \frac{10}{\sqrt{x-5}}$ is given by
- (a) $x \geq 5$ (b) $x \leq -5$ (c) $x \geq 2$ (d) $x > 5$
15. If $A = \frac{h}{2}(a + b)$, then $b =$
- (a) $\frac{2}{h}A - a$ (b) $\frac{2A - a}{h}$ (c) $\frac{2(A - a)}{h}$ (d) $2A - a$
16. Which of the following is a true statement?
- I. $-\frac{10}{3} < -|-4|$ II. $-|-3| > |-1| - |-2|$ III. $-|-2| + 2 > -(-2) - |-6 - 3|$
- (a) I only (b) II only (c) III only (d) I and II only
17. Simplify the expression $\left(\frac{5x^{-2}}{4x^2}\right)^{-2}$.
- (a) $\frac{25}{16x^8}$ (b) $\frac{16x^8}{25}$ (c) $25x$ (d) $16x^8$
18. Factor the expression $25x^2 - 16y^2$.
- (a) $(5x + 4y)(5x - 4y)$ (b) $(5x - 4y)^2$ (c) $(5x + 4y)(5x + 4y)$
 (d) $(5x - 4y)(5x - 4y)$
19. Factor the expression $3x^2 + 20x + 25$.
- (a) $(x + 5)(3x + 5)$ (b) $(3x + 5)(x + 5)$ (c) $(3x - 5)(x - 5)$
 (d) $(x - 5)(3x - 5)$

20. Factor the expression $3x^3 - 39x^2 + 120x$.
- (a) $3x(x - 10)(x + 4)$ (b) $3x(x - 5)(x + 8)$ (c) $3x(x - 5)(x - 8)$
 (d) $3x(x + 5)(x - 8)$
21. $\frac{x}{x^2 - 81} - \frac{9}{81 - x^2} =$
- (a) $\frac{1}{x + 9}$ (b) $\frac{1}{x - 9}$ (c) $\frac{x - 9}{x + 9}$ (d) $\frac{x + 9}{x - 9}$
22. Let $(-3, 3)$ and $(-6, -2)$ be points in the Cartesian plane. Find the distance between the points.
- (a) $\sqrt{34}$ (b) 82 (c) $\sqrt{82}$ (d) 34
23. Find the center and radius of the circle whose equation is $(x - 2)^2 + (y - 3)^2 = 4$.
- (a) Center: $(-2, -3)$, Radius = 2 (b) Center: $(2, 3)$, Radius = 2
 (c) Center: $(-2, -3)$, Radius = 4 (d) Center: $(2, 3)$, Radius = 4
24. Find an equation of the line that passes through the point $(3, 10)$ and is parallel to the line $x - 3y = 1$.
- (a) $y = \frac{1}{3}x + 9$ (b) $y = 3x + 1$ (c) $y = -3x + 19$ (d) $y = -\frac{1}{3}x + 11$
25. Solve for x : $2x - 3(x - 4) = 5$
- (a) 7 (b) -17 (c) $-\frac{7}{5}$ (d) $\frac{7}{5}$
26. The solution set of the equation $|2 - 4x| = 12$ is
- (a) $\left\{-\frac{5}{2}\right\}$ (b) $\left\{\frac{5}{2}\right\}$ (c) $\left\{\frac{7}{2}\right\}$ (d) $\left\{-\frac{5}{2}, \frac{7}{2}\right\}$
27. Simplify: $(5 - 2x)(3) - (3x + 2)(-2)$.
- (a) $-6x^2 + 11x + 10$ (b) $-9x + 1$ (c) $-10x + 20$ (d) 19

Answers:

1-d, 2-c, 3-b, 4-a, 5-c, 6-a, 7-d, 8-c, 9-d, 10-b, 11-b, 12-d, 13-b, 14-d, 15-a, 16-c, 17-b, 18-a, 19-a, 20-c, 21-b, 22-a, 23-b, 24-a, 25-a, 26-d, 27-d