

Montclair State University (MSU), Department of Mathematical Sciences  
**Sample Questions for MATH 111/112/114 Readiness Test**

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  $ac^2 + a^3b$  is  $a = 2, b = 3$ , 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