

Sample Questions for MATH 116 /MATH 122 Readiness Test

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

- $3(2^2 - 6) =$
(a) -6 (b) 6 (c) 24 (d) 48
- $8^{-2/3} =$
(a) $16\sqrt{2}$ (b) $\frac{1}{4}$ (c) $5\frac{1}{3}$ (d) 4
- If angle A is in the first quadrant and $\tan A = \frac{3}{4}$, then $\sec A =$
(a) $\frac{4}{5}$ (b) $\frac{3}{5}$ (c) $\frac{5}{4}$ (d) 4
- If $\sin x - \cos x = 0$ and $0^\circ \leq x \leq 180^\circ$, then $x =$
(a) 45° (b) 90° (c) 135° (d) -1
- $\log_2 8 =$
(a) 16 (b) 9 (c) 4 (d) 3
- The graph of $y = \sqrt{9 - x^2}$ is
(a) a semicircle (b) an ellipse (c) a parabola (d) a point
- The minimum value attained by $y = 3 \sin(4x + 5)$ is
(a) 3 (b) 4 (c) 5 (d) -3
- The slope of the straight line given by $2x + 3y = 4$ is
(a) 2 (b) 3 (c) $\frac{3}{2}$ (d) $-\frac{2}{3}$
- For a circle, circumference $C = 2\pi r$ and diameter $d = 2r$, where r is the circle's radius. Express C in terms of d . $C =$
(a) $4\pi d$ (b) $2\pi d$ (c) πd (d) $\frac{\pi}{d}$

10. $\cos\left(\frac{3\pi}{4}\right) =$
- (a) $-\frac{\sqrt{2}}{2}$ (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) $\frac{\sqrt{3}}{2}$
11. If $\log_4 x - \log_4(x - 1) = \frac{1}{2}$ then the solution set for x is
- (a) $\{ \}$ (b) $\{2\}$ (c) $\{-1\}$ (d) $\left\{\frac{1 - \sqrt{3}}{2}, \frac{1 + \sqrt{3}}{2}\right\}$.
12. The solution to the equation $4^{2x-7} = 64$ is $x =$
- (a) 5 (b) $\frac{23}{2}$ (c) $\frac{71}{2}$ (d) 4
13. If $f(x) = x^2 - 3x + 4$ then $f(x + 2) - f(2) =$.
- (a) $x^2 - 3x + 4$ (b) $x^2 + x$ (c) $x^2 + x - 8$ (d) $x^2 - 3x - 4$
14. Let $f(x) = x^2 - x - 1$ and $g(x) = 4x$. Find $f(g(x))$.
- (a) $x^3 - 4x^2 - 4x$ (b) $x^2 + 3x - 1$ (c) $16x^2 - 4x - 1$ (d) $4x^2 - 4x - 4$
15. Let $f(x) = 16 - x^2$ and $g(x) = 4 - x$. Find $\left(\frac{f}{g}\right)(x)$.
- (a) $-x^2 + x + 12$ (b) $-x^2 - x + 20$ (c) $x^3 - 4x^2 - 16x + 64$ (d) $4 + x$
16. Let $f(x) = 2\sqrt{x}$ and $g(x) = x - 4$. Find $g(f(9))$.
- (a) 2 (b) $2\sqrt{5}$ (c) 30 (d) 11
17. Which equation represents y as a function of x .
- (a) $x = 10$ (b) $\sin x + y^4 = 6$ (c) $y - 6x^2 = 7x$ (d) $3x = y^2$
18. Find the domain of the function $h(x) = \frac{5x^2 - 2x + 6}{x(x^2 - 64)}$.
- (a) All real numbers $x \neq \pm 8, 0$ (b) All real numbers $x \neq \pm 8$
(c) All real numbers $x \neq \pm 64, 0$ (d) All real numbers $x \neq 8$
19. The domain of the function $f(x) = \sqrt{16 - x^2}$ is
- (a) $0 \leq x \leq 4$ (b) $-4 \leq x \leq 4$ (c) All real numbers
(d) All real numbers $x \neq \pm 4$

20. $\cos^4 x - 2 \cos^2 x + 1 =$
 (a) $1 - \cos^2 x$ (b) 1 (c) $\cos^4 x$ (d) $\sin^4 x$
21. If $\sin x = -\frac{3}{5}$, then $\cos(2x) =$
 (a) $-\frac{18}{25}$ (b) $-\frac{4}{5}$ (c) $\frac{7}{25}$ (d) $\frac{4}{5}$
22. The expression $\log_4(x^3\sqrt{y})$ is equivalent to
 (a) $\log_4 x^3 - 2 \log_4 y$ (b) $3 \log_4 x + \frac{1}{2} \log_4 y$ (c) $3 \log_4 x - \frac{1}{2} \log_4 y$
 (d) $\log_4 x^3 + 2 \log_4 y$
23. Convert to degree measure: $\frac{5\pi}{12}$ radians.
 (a) 82° (b) 150° (c) 36° (d) 75°
24. Convert to radian measure: 240° .
 (a) $\frac{3\pi}{4}$ (b) $\frac{43,200}{\pi}$ (c) $\frac{3\pi}{2}$ (d) $\frac{4\pi}{3}$
25. Simplify $\csc^2 x - \cos^2 x \csc^2 x$.
 (a) $-\cos^2 x$ (b) $\sin^2 x$ (c) 1 (d) $\csc x$
26. Find all solutions of $\sin^2 x - \sin x = 0$, for $0 \leq x < 2\pi$. The sum of these solutions is
 (a) $\frac{7\pi}{2}$ (b) $\frac{3\pi}{2}$ (c) 3π (d) π
27. If $\sin \theta > 0$ and $\tan \theta < 0$, determine the quadrant in which θ lies.
 (a) I (b) II (c) III (d) IV
28. To obtain the height of a tree, you measure the tree's shadow and find that it is 20 feet long. You also measure the shadow of a 5-foot pole and find that it is 2 feet long. How tall is the tree?
 (a) 50 feet (b) 8 feet (c) 100 feet (d) 102 feet
29. Simplify the expression $2 - \ln e^{2x}$.
 (a) $2 - e^{2x}$ (b) $e^{2x} + 2$ (c) $2 - 2x$ (d) $2x - \ln 2$
30. Let i be the imaginary unit defined by $i = \sqrt{-1}$. Then $(1 + i)^2 - (2 - 3i)^2 =$
 (a) $5 + 14i$ (b) 5 (c) $5 + 8i$ (d) $-13 - 10i$

31. Find the solution of the equation $\frac{4}{k-1} - \frac{1}{k+4} = 0$.
- (a) -5 (b) $\frac{17}{5}$ (c) 3 (d) $-\frac{17}{3}$
32. Let i be the imaginary unit defined by $i = \sqrt{-1}$. Then $i^{57} =$
- (a) 1 (b) i (c) $-i$ (d) -1
33. The Solution set of the equation $\sqrt{x+25} - 5 = -x$ is
- (a) $\{0\}$ (b) $\{11\}$ (c) $\{-9, 11\}$ (d) $\{0, 11\}$
34. The solution set of the equation $|x^2 - 6x + 7| = 2$ is
- (a) $\{0, -4, -2\}$ (b) $\{1, 3, 5\}$ (c) $\{-2, -1\}$ (d) $\{2, 4, 6\}$
35. Solve the inequality $|x - 3| \leq 3$.
- (a) $x < 0, x > 6$ (b) $0 \leq x \leq 6$ (c) $x \leq 0, x \geq 6$ (d) $0 < x < 6$
36. Solve the inequality $x^2 + x - 12 > 0$.
- (a) $x < -3, x > 4$ (b) $-4 < x < 3$ (c) $x < -4, x > 3$ (d) $-3 < x < 4$
37. Find a function that has amplitude = 2 and period = 3π .
- (a) $y = 2 \sin \frac{2x}{3}$ (b) $y = \sin \frac{2x}{3}$ (c) $y = \sin 3\pi x$ (d) $y = 2 \sin \frac{\pi x}{3}$
38. $\arcsin\left(-\frac{\sqrt{3}}{2}\right) =$
- (a) $-\frac{\pi}{4}$ (b) $-\frac{\pi}{6}$ (c) 0 (d) $-\frac{\pi}{3}$

Answers:

1-a, 2-b, 3-c, 4-a, 5-d, 6-a, 7-d, 8-d, 9-c, 10-a, 11-b, 12-a, 13-b, 14-c, 15-d, 16-a, 17-c, 18-a, 19-b, 20-d, 21-c, 22-b, 23-d, 24-d, 25-c, 26-b, 27-b, 28-a, 29-c, 30-a, 31-d, 32-b, 33-a, 34-b, 35-b, 36-c, 37-a, 38-d