MAT 111 Pretest

If you plan to take MAT 111, then you will be expected to have a strong foundation in intermediate algebra. The following pretest contains examples of problems your instructor will expect you to be able to do BEFORE you enter the course. If you are not successful on this pretest, then you are likely to struggle with MAT 111. If this material looks familiar, but you haven’t seen it for a while, then you should review these concepts to prepare yourself for the course. If this material is unfamiliar to you, then you should take MAT 109 before registering for MAT 111. You are also encouraged to take the MAT 109 pretest to brush-up on your basic algebra skills.

Questions

1. Simplify, then write your answer with positive exponents only: \[
\left( \frac{3^{-1}}{7^{-2} x^2} \right) \left( \frac{3\sqrt{x}}{49x} \right)
\]

2. Solve the system of equations algebraically:
   \[
   2x + 3y = 9 \\
   -3x - 7y = 12
   \]

3. If \( f(x) = x^3 \) and \( g(x) = 2x - 1 \), find \( 5f(2) + \frac{1}{3}g(-7) \)

4. Solve for \( x \): \( ax + b = c - b(x - a) \)

5. Solve for \( x \): \( \frac{6}{x + 3} - \frac{5}{x - 2} = \frac{-20}{x^2 + x - 6} \)

6. Find the exact value of: \( \sin 45^\circ + \cos 60^\circ \)

7. Complete the ordered pair \((?,7)\) that will satisfy the equation \( y = -4x + 5 \)

8. True or false? \( \sqrt{a^2 + b^2} = a + b \)

9. If \( f(x) = 3x^2 + 5x \), find and simplify:
   (a) \( f(1/2) \)
   (b) \( f(a + 4) \)

10. Find the equation (in slope-intercept form) of a line passing through the points \((2,-1)\) and \((-4,11)\)

11. Solve for \( x \): \( x^2 - 3x - 40 = 0 \)

12. Solve for \( x \): \( x - \sqrt{x - 1} = 1 \)

13. Simplify: \( \frac{(\sqrt{x} + 1)^2}{x} \)

14. Simplify: \( \sqrt{2^{4x} \cdot 5^{4x}} \)
MAT 111 Pretest Answers

1. $\frac{1}{x^{5/2}}$

2. $x = \frac{99}{5}, y = -\frac{51}{5}$

3. 35

4. $x = \frac{ab - b + c}{a + b}$

5. $x = 7$

6. $\frac{\sqrt{2} + 1}{2}$

7. (3, -7)

8. false

9. (a) $\frac{13}{4}$
    (b) $3a^2 + 29a + 68$

10. $y = -2x + 3$

11. $x = 8, x = -5$

12. $x = 2, x = 1$

13. $\frac{x + 2\sqrt{x} + 1}{x} = 1 + \frac{2}{x^{1/2}} + \frac{1}{x}$

14. $100^x$