The following is a sample test to check if you have the knowledge considered to be prerequisite for math 101. (This is not to be considered as a study guide for the placement exam.)

Do each of the following problems.

1. Give an example of a nonpositive rational number that is not an integer.

2. Simplify: $\dfrac{10 \div (8 - 6) + 9 \cdot 4}{2^5 + 3^2}$

3. Simplify: a) $\dfrac{48x^{12}}{16x^4}$ b) $\left(\dfrac{45x^{-4}y^2}{9z^{-8}}\right)^{-3}$ c) $\dfrac{2x^{5/6} \cdot y^{2/3}}{6x^{-2/3}}$ d) $(-32)^{2/5}$

4. Perform the indicated operations: a) $(6x^2y^3 - 9xy) - (5x^2y^3 - 4xy)$
   b) $(2x - 7)(3x + 4)$

5. Factor completely: a) $3x^2 - 10x - 8$ b) $36x^2 - 49y^9$

6. Simplify the following: a) $\sqrt{216x^5y^3}$ b) $\sqrt[3]{48w^6z^5}$

7. Given $f(x) = -x^2 + 3x - 7$, find a) $f(-2)$ b) $f(n)$

8. Rationalize the denominator: $\dfrac{5}{3 - \sqrt{2}}$

For problems 9 through 13, solve each equation.

9. $3(7 - 2x) = 14 - 8(x-1)$ 10. $2x^2 - x = 3$ 11. $\dfrac{x}{x+1} + \dfrac{4}{x+6} = \dfrac{3x - 8}{x^2 + 7x + 6}$

12. $5 + \sqrt{x + 7} = x$ 13. $|x-3| = 2$

For the problems 14 through 18, solve each inequality, graph the solution of a number line, and write final answers in interval notation.

14. $13 - 7y \geq 10y - 4$ 15. $-3 < 2x + y \leq 7$ 16. $2x - 5 \leq -7$ or $2x - 5 > 1$

17. $|3x + 2| < 5$ 18. $|5 - 2x| \geq 1$

19. A flower seed company has a rectangular test plot with a perimeter of 322m. The length is 25m more than the width. Find the dimensions of the plot.

20. Find the equation on the line in slope-intercept form through the points (3, -4) and (0 ,5).

21. Graph the line $2x - 3y = 12$.