Math 115 Practice Test #2 (Chapters 3 & 4)

1. Evaluate each expression:
   a. \((-4)^3\)  
   b. \(-4^2\)  
   c. \(2^{-3} - 4^{-1}\)  
   d. \(\left(-\frac{2}{3}\right)^4\)

2. Simplify and write the answer using positive exponents:
   a. \(\left(\frac{3x^2}{5}\right)^0\)  
   b. \(x^{-4}x^{-6}\)  
   c. \(\left(\frac{2a^{-3}}{b^5}\right)^{-3}\)  
   d. \(\left(\frac{2x^{-4}y^3}{xy^2}\right)^{-2}\)

3. Perform the given operations:
   a. \((2x^2y)^2(3xy^3)\)  
   b. \(-\frac{96x^5y^5}{12x^2y}\)  
   c. \(\frac{35x^8 - 45x^4}{5x^4}\)  
   d. \(-\frac{9x^5 + 3x^4 - 12}{3x^3}\)  
   e. \((-4x^2 + 3x + 6) - (-x^2 + 9x - 14)\)  
   f. \((-x - 8)(-3x + 6) - (-7x + 10)\)  
   g. \(3[2y - (y - 2)] - 4(y - 2)\)  
   h. \((x - 4)(x + 6)\)  
   i. \((3x + 5)^2\)  
   j. \((5x + 3y)(5x - 3y)\)

4. Divide the given polynomials:
   a. \((x^2 + 8x - 65) ÷ (x - 5)\)  
   b. \((7x^4 + 30x^3 - 30x - 10) ÷ (x + 4)\)

5. Write in scientific notation:
   a. \(1,357,000,000\)  
   b. \(0.00000062\)

6. Write a polynomial that represents the area and the perimeter of the rectangle.

   \[
   \begin{array}{c}
   \text{2x+4} \\
   \text{x-3}
   \end{array}
   \]

7. Factor completely:
   a. \(2x^3 - 8x\)  
   b. \(x^2 - 5x - 24\)  
   c. \(4x^2 + 17x - 15\)  
   d. \(mt - 2t - mx + 2x\)

8. Solve each equation.
   a. \(x^2 - x - 12 = 0\)  
   b. \(4x^2 = 9x\)  
   c. \((n + 7)(n - 3) = -9\)  
   d. \(36x^3 - 9x = 0\)  
   e. \(n^2 + 16n = -48\)  
   f. \(16x^3 + 40x^2 + 25x = 0\)
9. Three times the square of a number is equal to 18 times that number. What is the number?

10. The product of two consecutive odd whole numbers is one less than five times their sum. Find the whole numbers.

11. The length of a rectangle is 2 inches less than twice its width. If the area of the rectangle is 112 square inches, find the length of the rectangle.

12. The length of one leg of a right triangle is 3 centimeters more than the length of the other leg. The length of the hypotenuse is 15 centimeters. Find the lengths of the two legs.