Math 150 Week in Review 2 Problem Set

(Parts of problems 1, 5, and 10 were taken from Precalculus: Functions and Graphs by Swokowski/Cole)

1. Solve the following equation for the variable \( h \): \[ S = 2(lw + hw + hl) \]

2. Solve the following equations.
   (a) \( 4x^2 + 24x + 1 = 0 \)
   (b) \( \sqrt{32} - 6x + 6 = x \)
   (c) \( |4x - 10| = 2 \)
   (d) \( \frac{2}{x + 4} - \frac{x}{x - 2} = 3 \)
   (e) \( x^{1/2} - 2x^{1/4} - 3 = 0 \)

3. How many real solutions do the following quadratic equations have?
   (a) \( -2x^2 + 5x - 7 = 0 \)
   (b) \( -3x^2 - 6x + 4 = 0 \)

4. Kristina and Matt are putting together a puzzle. It would take Matt 5 hours more than Kristina to put the puzzle together by himself. Together, they can put the puzzle together in 6 hours. How long does it take Kristina to put it together by herself?

5. I have a 20 ounce bottle of lemonade that is 60% real lemon juice. How much water should I add to the bottle to reduce the concentration of real lemon juice to 50%?

6. A farmer plans to fence off a large rectangular lot and then further fence off 4 pens of equal size inside the lot. If the area of the lot is 96 \( ft^2 \) and the farmer uses 60 ft of fencing, find the dimensions of the lot.

7. Two cars leave a parking lot at the same time. One heads due west and the other heads due south. The car heading west is going 2 mph faster than the car heading south. After 1.5 hours they will be 15 miles apart. How fast is the car heading south going?

8. Solve the following inequalities:
   (a) \( 2| - 11 - 7x | - 2 > 10 \)
   (b) \( |5x - 2| \leq 8 \)
   (c) \( \frac{3x + 5}{2 - x} < 4 \)
   (d) \( \frac{x}{2x - 1} \geq \frac{3}{x + 2} \)

9. Shade the region in the Cartesian plane given by the set \( \{(x, y) \mid -3 < x \leq 4, |y| > 2\} \)

10. Verify that a triangle with the following vertices is a right triangle and find its area: \( A(8, 5), B(1, -2), \) and \( C(-3, 2) \).

11. Find the \( x \) and \( y \)-intercepts of the following graphs and test for symmetry.
   (a) \( x^3 + y = 8 \)
   (b) \( y = |3x| + 4 \)
(c) \[ x = y^5 - 4y^3 \]

12. Find the equation of the circle that:
   
   (a) has center \((5, -6)\) and radius 12.
   (b) has a diameter with endpoints \((5, -2)\) and \((7, 6)\).

13. Find the center and radius of the circle \(2x^2 + 2y^2 - 6x + 5y = 1\).

14. Solve the following graphically.
   
   (a) \[ x^2 + \sqrt{x^4 + 5} = x^3 - 7x \]
   (b) \[-0.58x \leq 0.87x - 5x^{1/3} \]