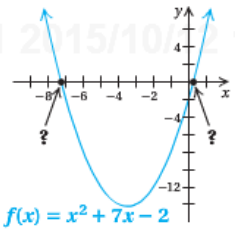
9.1-9.3 In-class Practice Math 085

1. a) Solve: $x^2 + 7x - 2 = 0$
   b) Find the x-intercepts of $f(x) = x^2 + 7x - 2$



2. Solve by **factoring**.

   a) $a^2 + 2a = 15$
   b) $2x^2 - x - 3 = 0$

3. Solve by using the **square root** property.

   a) $9x^2 = 16$
   b) $\left(x + \frac{2}{3}\right)^2 = \frac{5}{9}$
   c) $2y + 1 = \frac{18}{2y+1}$
   d) $n^2 + 8n + 16 = 50$

4. Solve by **completing the square**.

   a) $x^2 - x = 2$
   b) $4a^2 + 20a - 12 = 0$
   c) $p^2 + 2p + 35 = 10 - 6p$
   d) $x^2 - \frac{2}{5}x - 3 = 0$
   e) $2x^2 + 7x + 5 = 0$
   f) $3r^2 - r = r - 15$

5. Given $f(x) = x^2 - 4x$ and $g(x) = 2x - 2$, find all values x for which $f(x) = g(x)$.

6. Solve using the **Quadratic Formula**.

   a) $-x^2 - 3x + 5 = 0$
   b) $\frac{3}{4}x^2 - 2x + \frac{1}{2} = 0$
   c) $2y^2 + 1 = 2y$
   d) $(x - 10)(x - 2) = -20$
   e) $(3x + 1)^2 = 2(1 - 3x)$
   f) $\frac{1}{y} + \frac{1}{y+2} = \frac{1}{3}$
   g) $x = \frac{2(x+3)}{x+5}$
   h) $2x^2 + \sqrt{3}x - 3 = 0$

7. Use the **discriminant** to determine the number and type of solutions for each of the equations.

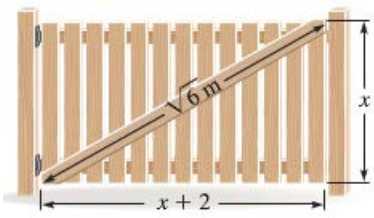
   a) $5x^2 - x + 3 = 0$
   b) $x^2 - 8x + 16 = 0$
   c) $6x^2 = 2 - 5x$
   d) $2x^2 - 7 = 0$

8. Consider the equation $x^2 + 6x + c = 0$. For what values of c will the equation have a single solution, two real solutions, two non-real solutions?

9. Find a quadratic equation that has the solutions $x = -2/5$, and $x = 3$.

10. ***Concept Check*** Is it possible for the solution of a quadratic equation with integer coefficients to include just one irrational number? Why or why not?

11. The width of a rectangular gate is 2 meters larger than its height. The diagonal brace measures $\sqrt{6}$ m. Find the width and height.



12. *Concept Check* Study this incorrect "solution." What went wrong?

a)
$$x = \sqrt{3x + 4}$$
$$x^2 = 3x + 4$$
$$x^2 - 3x - 4 = 0$$
$$(x - 4)(x + 1) = 0$$
$$x - 4 = 0 \quad \text{or} \quad x + 1 = 0$$
$$x = 4 \quad \text{or} \quad x = -1$$
Solution set: $\{4, -1\}$

b)
$$2(x - 1)^2 - 3(x - 1) + 1 = 0$$
$$2u^2 - 3u + 1 = 0$$
Let $u = x - 1$.
$$(2u - 1)(u - 1) = 0$$
$$2u - 1 = 0 \quad \text{or} \quad u - 1 = 0$$
$$u = \frac{1}{2} \quad \text{or} \quad u = 1$$
Solution set: $\left\{\frac{1}{2}, 1\right\}$

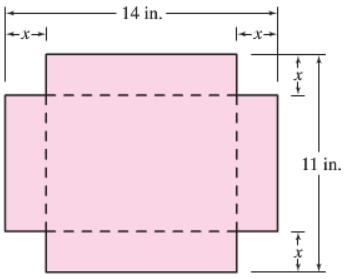
13. Solve each equation and check your solutions.

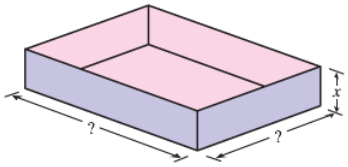
a) $x - 10\sqrt{x} + 9 = 0$
b) $\left(1 + \sqrt{x}\right)^2 + \left(1 + \sqrt{x}\right) - 6 = 0$
c) $2z^{-2} + z^{-1} - 1 = 0$
d) $6a^4 - 17a^2 + 5 = 0$
e) $(x^2 + x)^2 + 12 = 8(x^2 + x)$
f) $\frac{1}{(y+1)^2} - 2\left(\frac{1}{y+1}\right) = 3$

14. John takes 3 hours longer than Andrew to peel 500 pounds (lb) of apples. If together they can peel 500 lb of apples in 8 hours, then how long would it take each one working alone?

15. Debbie traveled by boat 5 miles upstream to fish in her favorite spot. Because of the 4-mph current, it took her 20 minutes longer to get there than to return. How fast will her boat go in still water?

16. Thomas is going to make an open-top box by cutting equal squares from the four corners of an 11 inch by 14 inch sheet of cardboard and folding up the sides. If the area of the base is to be 80 square inches, then what size square should be cut from each corner?





17. One principle used by the ancient Greeks to get shapes that are pleasing to the eye in art and architecture was the Golden Rectangle. If a square is removed from one end of a Golden Rectangle, as shown in the figure, the sides of the remaining rectangle are proportional to the original rectangle. So the length and width of the original rectangle satisfy

$$\frac{L}{W} = \frac{W}{L - W}.$$

If the length of a Golden Rectangle is 10 meters, then what is its width?