1. Find the y-intercept, the equation of the axis of symmetry, and the x-coordinate of the vertex for $f(x) = 2x^2 + 8x - 3$. Then graph the function by making a table of values. (Lesson 4-1) **See margin.**

2. **MULTIPLE CHOICE** For which equation is the axis of symmetry $x = 5$? (Lesson 4-1) **B**

   A $f(x) = x^2 - 5x + 3$

   B $f(x) = x^2 - 10x + 7$

   C $f(x) = x^2 + 10x - 3$

   D $f(x) = x^2 + 5x + 2$

3. Determine whether $f(x) = 5 - x^2 + 2x$ has a maximum or a minimum value. Then find this maximum or minimum value and state the domain and range of the function. (Lesson 4-1) **max.; 6; D = {all real numbers}; R = $\{f(x) \mid f(x) \leq 6\}$**

4. **PHYSICAL SCIENCE** From 4 feet above the ground, Maya throws a ball upward with a velocity of 18 feet per second. The height $h(t)$ of the ball t seconds after Maya throws the ball is given by $h(t) = -16t^2 + 18t + 4$. Find the maximum height reached by the ball and the time that this height is reached. (Lesson 4-1) **9.0625 feet at 0.5625 seconds**

9. **BASEBALL** A baseball is hit upward with a velocity of 40 feet per second. Ignoring the height of the baseball player, how long does it take for the ball to fall to the ground? Use the formula $h(t) = v_0t - 16t^2$ where $h(t)$ is the height of an object in feet, v_0 is the object's initial velocity in feet per second, and t is the time in seconds. (Lesson 4-2) **2.5 seconds**

Solve each equation by factoring. (Lesson 4-3)

10. $x^2 - x - 12 = 0$ **$\{-3, 4\}$**

11. $3x^2 + 7x + 2 = 0$ **$\left\{-2, -\frac{1}{3}\right\}$**

12. $x^2 - 2x - 15 = 0$ **$\{-3, 5\}$**

13. $2x^2 + 5x - 3 = 0$ **$\left\{-3, \frac{1}{2}\right\}$**

14. Write a quadratic equation in standard form with roots -6 and $\frac{1}{4}$. (Lesson 4-3) **$0 = 4x^2 + 23x - 6$**

15. **TRIANGLES** Find the dimensions of a triangle if the base is $\frac{2}{3}$ the measure of the height and the area is 12 square centimeters. (Lesson 4-3) **base = 4 cm, height = 6 cm**

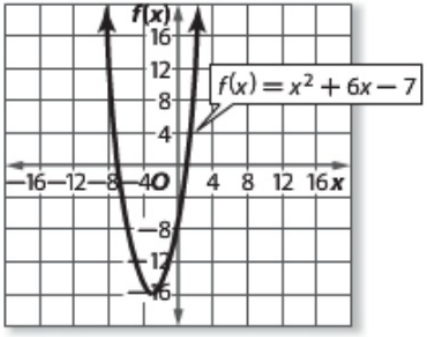
5. Solve $3x^2 - 17x + 5 = 0$ by graphing. If exact roots cannot be found, state the consecutive integers between which the roots are located. (Lesson 4-2)
between 0 and 1, and between 5 and 6

Use a quadratic equation to find two real numbers that satisfy each situation, or show that no such numbers exist. (Lesson 4-2)

6. Their sum is 15, and their product is 36. **3 and 12**

7. Their sum is 7, and their product is 15. **See margin.**

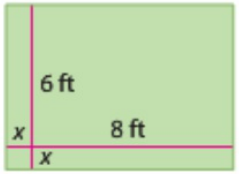
8. **MULTIPLE CHOICE** Using the graph of the function $f(x) = x^2 + 6x - 7$, what are the solutions to the equation $x^2 + 6x - 7 = 0$? (Lesson 4-2) **J**



F $-1, 6$ **H** $-1, 7$

G $1, -6$ **J** $1, -7$

16. **PATIO** Eli is putting a cement slab in his backyard. The original slab was going to have dimensions of 8 feet by 6 feet. He decided to make the slab larger by adding x feet to each side. The area of the new slab is 120 square feet. (Lesson 4-3)



a. Write a quadratic equation that represents the area of the new slab. **$120 = x^2 + 14x + 48$**

b. Find the new dimensions of the slab. **12 feet by 10 feet**

Simplify. (Lesson 4-4) **19. $11 + 9i$**

17. $\sqrt{-81}$ **$9i$**

18. $\sqrt{-25x^4y^5}$ **$5x^2y^2i\sqrt{y}$**

19. $(15 - 3i) - (4 - 12i)$

20. i^{37} **i**

21. $(5 - 3i)(5 + 3i)$ **34**

22. $\frac{3 - i}{2 + 5i}$ **$\frac{1}{29} - \frac{17}{29}i$**

23. The impedance in one part of a series circuit is $3 + 4j$ ohms and the impedance in another part of the circuit is $6 - 7j$ ohms. Add these complex numbers to find the total impedance in the circuit. (Lesson 4-4) **$9 - 3j$ ohms**