1. Given the quadratic function $7x^2 - 42 = -35x$ determine the discriminant and then determine the nature of the roots for the function.

2. Each of the following are a root resulting from the quadratic formula. Given that root, determine the second root and write a possible equation of the quadratic function in intercept form with each having an $a$-value of 1.
   
   a) $x = 7$  
   b) $x = 4\sqrt{13}$
   
   c) $x = -3i$  
   d) $x = 5 + 4i$

3. Use each pair of roots below to write a quadratic function in intercept form.
   
   a) $x = \pm \sqrt{7}$  
   b) $x = 2 \pm 5i$  
   c) $x = \pm 2\sqrt{3}$

4. Write the equation of a quadratic function, in standard form, with $x$-intercepts 5 and -2, and passes through the point (4,18)
5. Find the solutions of the following equations by using the quadratic formula.
   a) \(2x^2 - 6 = 3x\)  
   b) \(3x^2 + 6x = -2\)

6. Solve for \(x\) by using the square root (extracting the roots) method.
   a) \(3x^2 - 6 = 24\)  
   b) \(5x^2 = -45\)  
   c) \(2x^2 - 1 = 47\)
   d) \(\frac{1}{3}(x+4)^2 = 27\)  
   e) \((x-9)^2 + 3 = 51\)  
   f) \(-3(x-1)^2 = 27\)

7. Solve each of the following quadratic equations by completing the square?
   a) \(x^2 - 14x = 12\)  
   b) \(x^2 - 8x - 2 = 0\)  
   c) \(3x^2 - 12x = 9\)
8. The formula for an object launched or thrown with force is \( h(t) = -16t^2 + vt + s \) where \( h(t) \) is the height of the object at any time \( t \), in seconds, \( v \) is the initial velocity, and \( s \) is the initial height of the object. If a grasshopper jumps off the ground with an initial vertical velocity of 8 feet per second, answer the following questions.

a) What is the equation that gives the height, in feet, of the grasshopper as a function of the time, in seconds, of the grasshopper’s jump.

b) After how many seconds does the grasshopper land back on the ground?

c) How long does it take the grasshopper to reach its maximum height?

d) What is the maximum height reached by the grasshopper?

9. Ryan Zimmerman hits a ball to center field that is modeled by the quadratic equation \( h(t) = -7t^2 + 34t + 4 \), where \( h(t) \) is measured in feet and \( t \) is measured in seconds. Round answers to two decimal places.

a) How high does the ball go?

b) If the ball is hit into the right-center field gap and is out of the reach of the fielders, when does the ball hit the ground?

c) If the ball is hit to the right fielder and he catches the ball at a height of 3 feet, how long was the ball in flight?
10. Solve the system of equations by substitution.
   
   \[ y = 3x + 3 \]
   \[ y = x^2 - 1 \]

11. Solve the system of equations by any method of your choice.
   
   \[ y = x^2 + 7x + 100 \]
   \[ y + 10x = 30 \]

12. Solve each of the following quadratic equations by factoring first.
   
   a) \[ x^2 = -4x - 4 \]
   
   b) \[ 10x^2 + 100x + 250 = 0 \]