1.3 Quadratic Equations

Name ______________________

1. Solve the following equations:
   a) \( x^2 - 10x = -9 \)
   
   b) \( 7y^2 + 3y = y \)
   
   c) \( (v + 4)^2 = 14 \)

The **position equation** describes gravity’s effect on the height of an object. It says that

\[
h = -16t^2 + v_0 t + s_0
\]

where \( h \) is the height of an object in feet, \( v_0 \) is the initial velocity of the object in feet per second, \( h_0 \) is the initial height in feet, and \( t \) is the time that has passed in seconds.

2. A college algebra instructor jumps straight out from the top of 100-foot building into a shallow pool of water. How long will it take for the instructor to hit the water?

3. A college algebra student shoots a potato gun straight into the air and the potato hits the ground 4 seconds later. If the potato was launched from 5 feet above the ground, what was the muzzle velocity of the potato gun?
1.4 The Quadratic Formula

4. Which values of \( t \) cause \( y \) to be zero?
   a) \( y = t^2 - 1t + 12 \)
   b) \( y = t^2 - 11t - 12 \)
   c) \( y = 4t^2 - 8t - 9 \)

5. A college algebra student shoots a potato gun straight into the air with a velocity of 200 feet per second. If the potato was launched from 5 feet above the ground, when will the potato hit the ground?

6. A farmer builds a rectangular pen next to a river to cage his ostriches. There must be fence on 3 sides of the rectangle, but the river encloses the last side. If the pen is twice as long as it is wide (it runs along the river) and is 3200 square feet, what are the dimensions of the pen?