Lesson 4.2.5: Applying Quadratics

Targets:

1. I understand how to solve real world problems using quadratics.

Warm Up:

Now that we know how to use the quadratic formula, let's see if we can apply it to real life examples.

A ball is shot into the air from the edge of a building, 50 feet above the ground. Its initial velocity is 20 feet per second.
The equation $h = -16t^2 + 20t + 50$ can be used to model the height of the ball after t seconds. About how long does it take for the ball to hit the ground?

Practice 1

A ball is thrown straight up, from 3 m above the ground, with a velocity of 14 m/s. When does it hit the ground?

Ignoring air resistance, we can work out its height by adding up these three things:

The height starts at 3 m:		3
It travels upwards at 14 meters per second (14 m/s):		14t
Gravity pulls it down, changing its speed by *about* 5 m/s per second (5 m/s^2):		$-5t^2$
(Note for the enthusiastic: the $-5t^2$ is simplified from $-(½)at^2$ with a=9.81 m/s^2)		

Add them up and the height **h** at any time **t** is:

$$h = 3 + 14t - 5t^2$$

Practice 2

The number of mosquitoes in millions, m, in Brooklyn, New York depends on the June rainfall in centimeters, r, and can be modeled by the function $m = -r(r-4)$.

1. After how many centimeters of rainfall will there be no mosquitos left?

2. What is the maximum possible number of mosquitos?

3. After how many centimeters of rainfall will the maximum number of mosquitos occur?

Exit Ticket

You are standing on top of a building that is 15 meters high. You hit a golf ball off the building with an upward velocity of 20 m/s. Fill in the blanks in the given equation and find out when the ball will hit the ground.

$$h = -5t^2 + \_\_\_ t + \_\_\_\_$$