What you will learn about:
Solving Application

$h(t) = h_0 + V_0 t - 16t^2$

Suppose a pumpkin is fired straight upward from the barrel of a compressed-air cannon at a point 20 feet above the ground, at a speed of 90 feet per second, write an equation to model the height ***h*** over time ***t***.

$h(t) = 20 + 90t - 16t^2$ $\quad a = -16 \quad c = 20$

$b = 90$

What time will the pumpkin reach the maximum height? What is the maximum height?

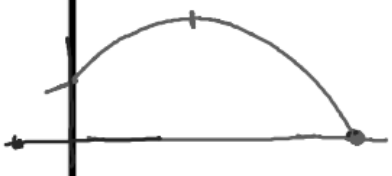
$h(2.8) = 20 + 90(2.8) - 16(2.8)^2$

$= 146.56$ ft

$max = \frac{-b}{2a}$

$= \frac{-90}{2(-16)}$

$= \frac{90}{32} = 2.8$ sec



At what time will the pumpkin hit the ground?

$x = \frac{-b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{2a}$

$0 = 20 + 90t - 16t^2$

$\frac{-90}{2(-16)} \pm \frac{\sqrt{(90)^2 - 4(-16)(20)}}{2(-16)}$

$2.8125 \pm \frac{96.05}{-32}$

$2.8125 \pm (-3.03)$

$2.8125 + 3.03$

5.84

$2.8125 - 3.03$

$-.22$

Nolan Arenado, All-Star third baseman for the Colorado Rockies, hit a home run last night. He made contact with the ball 4.5 feet off the ground and had an initial upward velocity of 147 feet per second. Write a function rule to find the height ***h(t)*** at various times ***t***.

$h(t) = 4.5 + 147t - 16t^2$

$0 = -16t^2 + 147t + 4.5$

$\frac{-b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{2a}$

How long will the ball be in the air?

$\frac{-147}{2(-16)} \pm \frac{\sqrt{147^2 - 4(-16)(4.5)}}{2(-16)}$

$4.59 \pm (-4.62)$

$4.59 - 4.62$

$-.03$ sec

$4.59 + 4.62$

9.21 sec