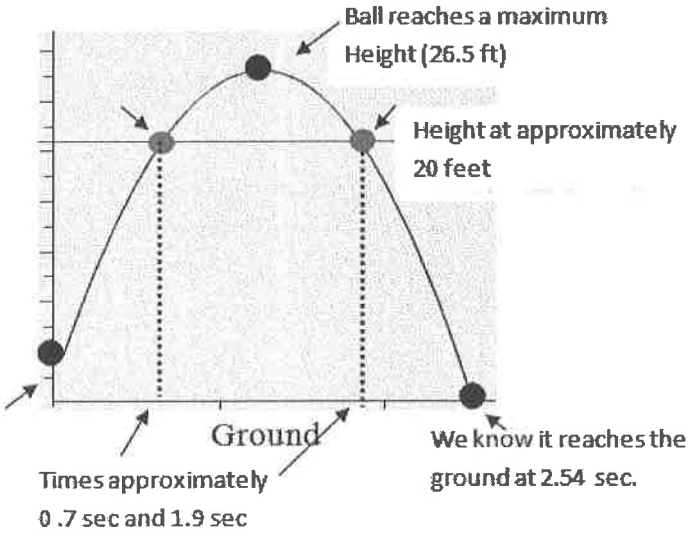
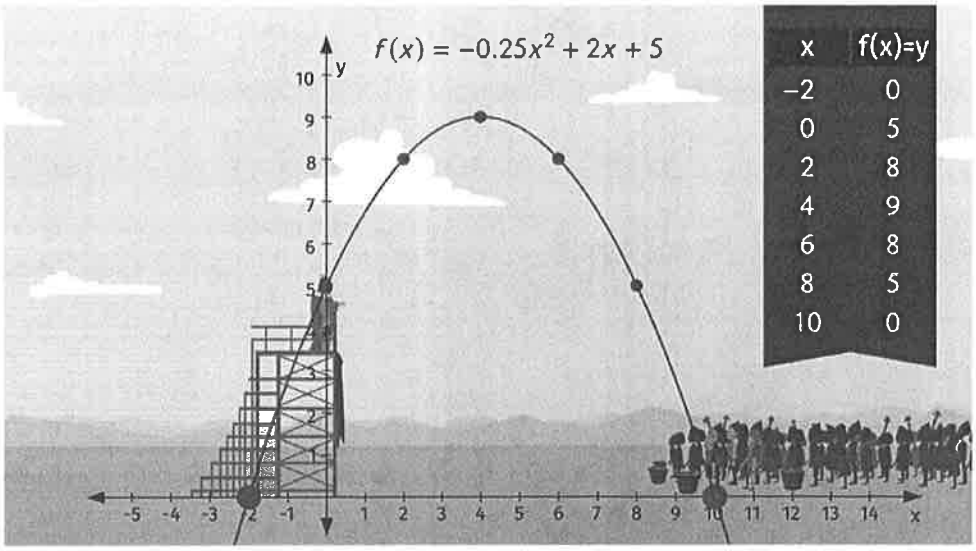
9.5C Quadratic Application

Apr 2-12:18 PM

Interpreting a quadratic function.



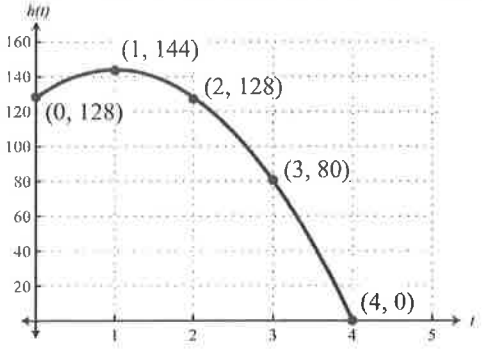
Mar 22-9:36 AM



x	f(x)=y
−2	0
0	5
2	8
4	9
6	8
8	5
10	0

Apr 11-8:47 AM

A rock is thrown into a lake from the top of a cliff. The relationship between the height (in feet) of the rock and time (in seconds) after the rock is thrown is illustrated in the graph below.



a) What is the initial height of the rock? 128 ft.

b) How high is the rock after 3 seconds? 80 ft.

c) What is the maximum height of the rock? 144 ft.

d) How long is the rock in the air? 4 seconds

Mar 22-9:42 AM

A cereal box has a height of 12 inches. The length is two times the width. The volume of the cereal box is 384 cubic inches. Find the length and width of the cereal box.

$V = l \cdot w \cdot h$

$384 = 2w \cdot w \cdot 12$

$384 = 24w^2$

$16 = w^2$

$4, -4 = w$

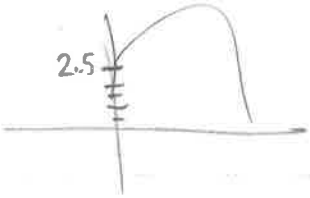
$w = 4$ in.

$l = 2w = 2 \cdot 4$

$l = 8$ in.

Closure

A kicker punts a football from a height of 2.5 feet above the ground with an initial velocity of 45 feet per second.



a) Write an equation that models this situation ($h = -16t^2 + v_0t + s_0$) $h = -16t^2 + 45t + 2.5$

b) The football is caught at a height of 5.5 feet above the ground. Find the amount of time the football is in the air. $h = 5.5$

$5.5 = -16t^2 + 45t + 2.5$

$-5.5 \quad -5.5$

$0 = -16t^2 + 45t - 3$

$\frac{-45 \pm \sqrt{(45)^2 - 4(-16)(-3)}}{-32}$

$\frac{-4 \pm 42.8}{-32}$

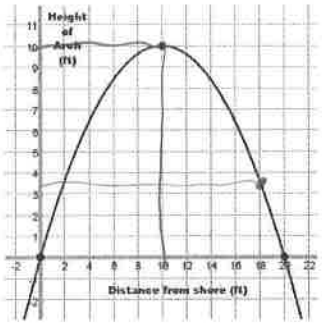
$\frac{-4 + 42.8}{-32} = -1.2$

$\frac{-4 - 42.8}{-32}$

1.5 sec.

Apr 2-12:17 PM

A golfball is hit from the shoreline of a water hazard. The graph below illustrates the relationship between the height of the golfball and the distance from the shoreline.



a) What is the height of the golfball when it is 18 ft from the shoreline?

3.5 ft.

b) If the distance from the shoreline is 10 ft, how high is the golfball?

10 ft.

c) What is the total horizontal distance the golfball traveled through the air?

20 ft.

Mar 22-9:48 AM

A soccer ball is kicked from the ground level with an initial velocity of 32 ft/s. After how many seconds will the ball hit the ground?

height is 0. $c = 0$

plug 0 in for y.

$y = -16x^2 + 32x$

$0 = -16x^2 + 32x$

$\frac{-32 \pm \sqrt{(32)^2 - 4(-16)(0)}}{2(-16)} = \frac{-32 \pm 32}{-32}$

$\frac{-32-32}{-32} = \frac{-64}{-32} =$ 2 sec

$\frac{-32+32}{-32} = 0$

A golf ball is hit from ground level with an initial velocity of 80 ft/s. After how many seconds will the ball hit the ground? $y = 0$

$y = -16x^2 + 80x + 0$

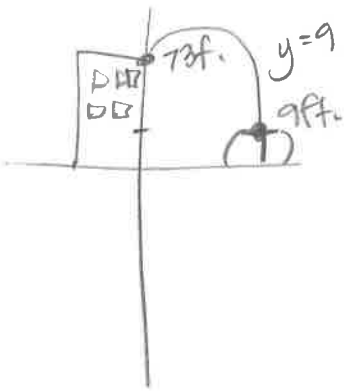
$0 = -16x^2 + 80x$

$\frac{-80 \pm \sqrt{80^2 - 4(-16)(0)}}{-32} = \frac{-80 \pm 80}{-32}$

$\frac{-80+80}{-32} =$ 0 sec

$\frac{-80-80}{-32} =$ 5 sec

Oct 22-1:07 PM



A stunt woman jumps from a building 73 ft high and lands on an air bag that is 9 ft tall. Her height above ground *h* in feet can be modeled by $h(t) = 73 - 16t^2$, where t is the time in seconds.

$9 = h$

a) How many seconds will the stunt woman fall before touching the air bag?

$9 = -16t^2 + 73$

$0 = -16t^2 + 64$

$0 = -16t^2 + 0x + 64$

$\frac{-0 \pm \sqrt{0^2 - 4(-16)(64)}}{-32} = \frac{\pm 64}{-32}$

$\frac{-64}{-32} = 2\text{sec}$

2 sec.

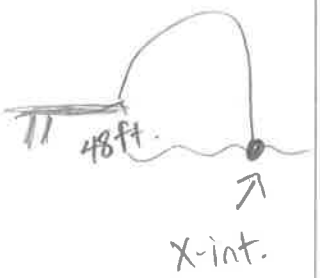
b) What is the maximum height of the stunt woman?

$x = \frac{-b}{2a}$ $\frac{-0}{2(-16)} = 0 = t$

$-16(0)^2 + 73$

73ft.

Oct 22-1:09 PM



The height of a diver above the water during a dive can be modeled by $h = -16x^2 + 8x + 48$, where h is the height in feet and x is the time in seconds.

a) How high is the diving board?

48 ft.

b) Find the time it takes for the diver to reach the water.

$0 = -16x^2 + 8x + 48$

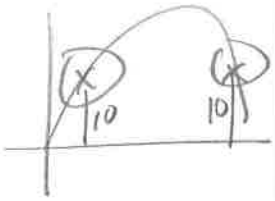
$\frac{-8 \pm \sqrt{8^2 - 4(-16)(48)}}{-32} = \frac{-8 \pm 56}{-32}$

$\frac{-8+56}{-32} = -1.5$

$\frac{-8-56}{-32} = 2\text{sec}.$

Oct 30-10:01 AM

The height of a fireworks rocket in meters can be approximated by $h = -5t^2 + 30t$, where h is the height is meters and t is the time in seconds.



a) Find the time it takes the rocket to reach a point 10 meters above the ground. $h = 10$

$10 = -5t^2 + 30t$

$0 = -5t^2 + 30t - 10$

$\frac{-30 \pm \sqrt{30^2 - 4(-5)(-10)}}{2(-5)} = \frac{-30 \pm 26.5}{-10}$

$\frac{-30 + 26.5}{-10} = 0.35$ sec.

$\frac{-30 - 26.5}{-10} = 5.65$ sec.

b) How high is the firework after 2 seconds?

$h = -5(2)^2 + 30(2)$

$h = -20 + 60$

$h = 40$ ft.

Oct 30-10:01 AM

The height ~~is feet of~~ a soccer ball kicked upward from the ground with initial velocity 60 feet per second is modeled by $h = -16t^2 + 60t$, where t is the time in seconds. Find the time it takes for the ball to return to the ground. Round to the nearest tenth of a second.

$h = 0$

$0 = -16t^2 + 60t + 0$

$\frac{-60 \pm \sqrt{(60)^2 - 4(-16)(0)}}{-32}$

$\frac{-60 \pm 60}{-32}$

$\frac{-60 + 60}{-32} = 0$

$\frac{-60 - 60}{-32} = 3.75$ sec.

Oct 30-10:01 AM

Homework

WS 9.5C Quadratic Application

Apr 2-12:19 PM