

Day 03 HW: Quadratic Applications

Name _____

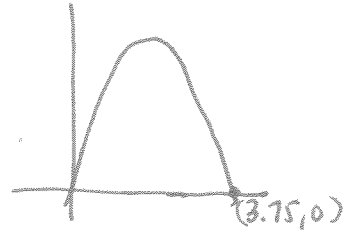
Date _____ Block _____

Use the formula $h(t) = v_0t - 16t^2$, where $h(t)$ is the height of an object in feet, v_0 is the object's initial velocity in feet per second, and t is the time in seconds.

1. Maura throws a baseball with an initial upward velocity of 60 feet per second.

a. Ignoring Maura's height, how long after she releases the ball will it hit the ground?

$y_{max}: 60$
 $h(t) = 60t - 16t^2$
 after 3.75 sec.



b. How high was the ball after 2 seconds?

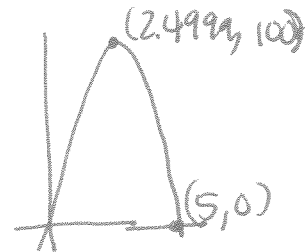
$x=2, y=56$ 56 feet

2. David threw a baseball into the air with an initial velocity of 80 feet per second.

$h(t) = 80t - 16t^2$

a. What is the maximum height the ball will travel?

$y_{max}: 110$
 $(2.4999, 100)$ 100 feet



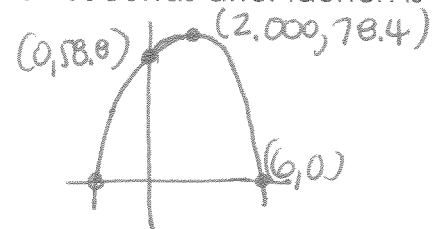
b. When will the ball hit the ground?

at 5 seconds

<http://www.purplemath.com/modules/quadprob.htm>

3. An object is launched at 19.6 meters per second (m/s) from a 58.8-meter tall platform. The equation for the object's height s at time t seconds after launch is $s(t) = -4.9t^2 + 19.6t + 58.8$, where s is in meters.

$y_{max}: 100$
 a. When does the object strike the ground?
 in 6 seconds



b. How many seconds would it take for the object to be 10 meters above the ground?

$10 = -4.9x^2 + 19.6t + 58.8$ 5.7 sec (5.736, 10)

$0 = -4.9x^2 + 19.6x + 48.8$ calc. zero. or $y=10$ calc. int. pt.

4. An object is launched directly upward at 64 feet per second (ft/s) from a platform 80 feet high. $s(t) = -4.9t^2 + 64t + 80$ $*s(t) = -16t^2 + 64t + 80$

a. What will be the object's maximum height?

$(6.531, 288.97959)$ 288.98 feet (1.99, 144) 144 feet

b. When will it attain this height?

$y_{max}: 300$
 $x_{max}: 20$

6.531 seconds

2.0 sec.

5. The given table lists the total estimated numbers of AIDS cases, by year of diagnosis from 1999 to 2003 in the United States

(Source: US Dept. of Health and Human Services, Centers for Disease Control and Prevention, HIV/AIDS Surveillance, 2003.)

Year	AIDS Cases
1999	41,356
2000	41,267
2001	40,833
2002	41,289
2003	43,171

$r^2 \approx .90$
 $y = 345.14x^2 - 1380896.514x + 1381262473$

a. Approximately how many AIDS cases would there be in 2006?

check window
change
Δ table

51,347.486

Calc. value $x = 2006$

b. In what year would the amount of AIDS cases be over 50,000?

after 2006

6. On Tuesday, May 10, 2005, 17 year-old Adi Alifuddin Hussin won the boys' shot-putt gold medal for the fourth consecutive year. His winning throw was 16.43 meters. A shot-puttler throws a ball at an inclination of 45° to the horizontal. The following data represent approximate heights for a ball thrown by a shot-puttler as it travels a distance of x meters horizontally.

$y = -0.0111x^2 + 1.05957x + .242$

$r^2 = .97$

Distance (m)	Height (m)
7	8
20	15
33	24
47	26
60	24
67	21

a. What would be the height of the ball if it travels 80 meters?

check window

$(80, 13.96)$

13.96 ~~feet~~ meters

b. When would the ball hit the ground?

change window

$95.675, -4E-12$

95.675 meters

7. The concentration (in milligrams per liter) of a medication in a patient's blood as time passes is given by the data in the following table:

$y = -56.214x^2 + 139.313x + 9.35$ $r^2 = .92$

a. What is the concentration of medicine in the blood after 4 hours have passed?

table $x = 4$ -332.827 mg/l

Time (Hours)	Concentration (mg/l)
0	0
0.5	78.1
1	99.8
1.5	84.4
2	50.1
2.5	15.6

b. When would the concentration of the medicine be at the maximum amount?

$(1.239, 95.663)$

1.239 hours