

3.1 Solving Quadratics by Projectile Motion CYU FOUR

Use when you get it right all by yourself

S Use when you did it all by yourself, but made a silly mistake

H Use when you could do it alone with a little help from teacher or peer

G Use when you completed the problem in a group

X Use when a question was attempted but wrong (get help)

N Use when a question was not even attempted

CONCEPTS	BASIC	INTERMEDIATE	ADVANCED
DN WEBSITE			

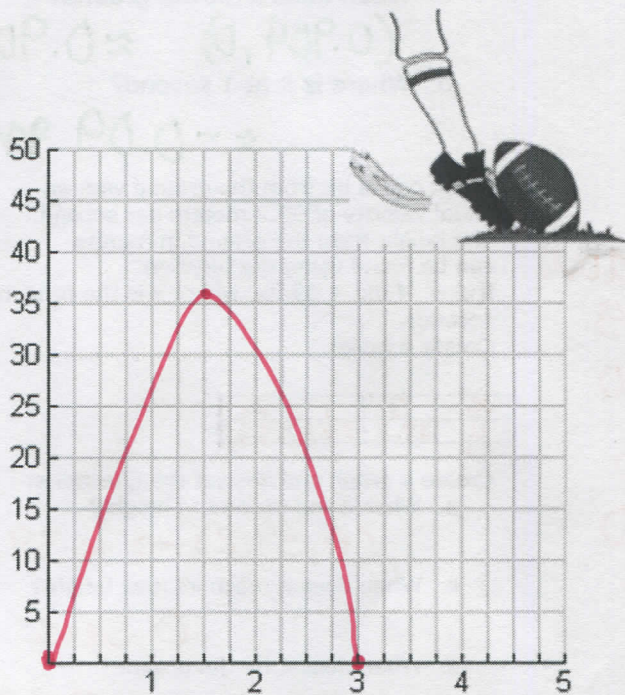
I. Fourth way: Projectile Motion.

1. An athlete can kick a football from the ground with an initial velocity of 48 feet per second. The height from the ground in feet can be found using the function $f(x) = -16x^2 + 48x$, where x is the time in seconds. Create a table:

x	0	1	2	3
y	0	32	32	0

Create a graph and answer the questions:

- a. What is the maximum height?
(1.5, 36) ≈ 36 ft
- b. When does it reach its max height?
≈ 1.5 sec
- c. When does it hit the ground?
≈ 3 sec
- d. Where is it at 1 second?
32 ft



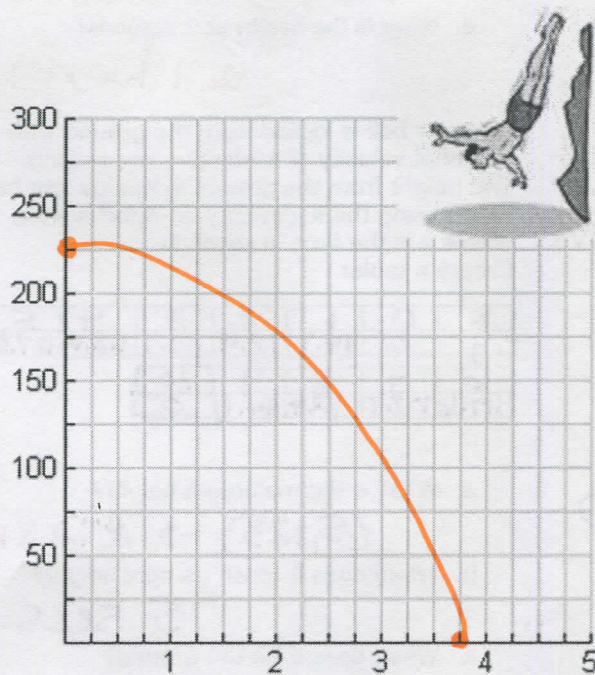
2. A cliff diver, drops into the water from a height of 225 feet. The height from the ground in feet can be found using the function $y = -16x^2 + 225$, where x is the time in seconds.

Create a table:

x	0	1	2	3
y	225	209	161	81

Create a graph and answer the questions:

- a. What is his maximum height?
(0, 225) 225 ft
- b. When does he reach his max height?
0 sec
- c. When does he hit the ground?
(3.75, 0) 3.75 sec
- d. Where is he at 1 second?
209 ft



window
0
5
0
50

window
-5
5
0
300
25

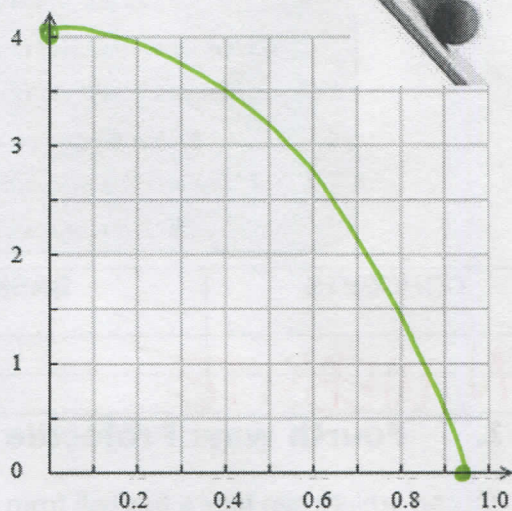
3. A ball rolls off a roof 4 meters high. The height from the roof can be found using the function $f(x) = -4.9x^2 + 4$, where x is the time in seconds.

Create a table:

x	0	1	2	3	4
y	4	-0.09	-15.6	-40.1	-74.4

Create a graph and answer the questions:

- a. What is the maximum height?
 $(0, 4)$ 4m
- b. When does it reach its max height?
 0 sels
- c. When does it hit the ground?
 $(0.904, 0) \approx 0.904$ sels
- d. Where is it at 1 second?
 ≈ -0.09 m



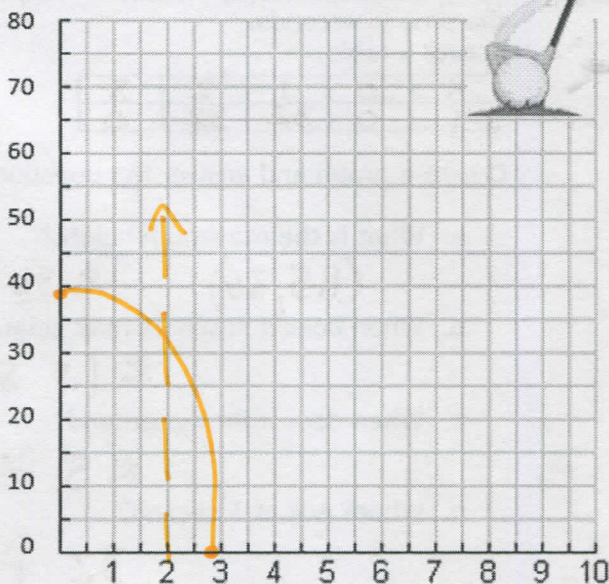
4. A golf ball is hit from the ground with an initial velocity of 39.2 meters per second. The height from the ground in meters can be found using the function $f(x) = -4.9x^2 + 39.2x$, where x is the time in seconds.

Create a table:

x	0	1	2
y	39.2	34.3	19.6

Create a graph and answer the questions:

- a. What is the maximum height?
 $(0, 39.2) \rightarrow \approx 39.2$ m
- b. When does it reach its max height?
 0 sels
- c. When does it hit the ground?
 $(2.83, 0) \approx 2.83$ sels
- d. What is the height at 2 seconds?
 ≈ 19.6 m

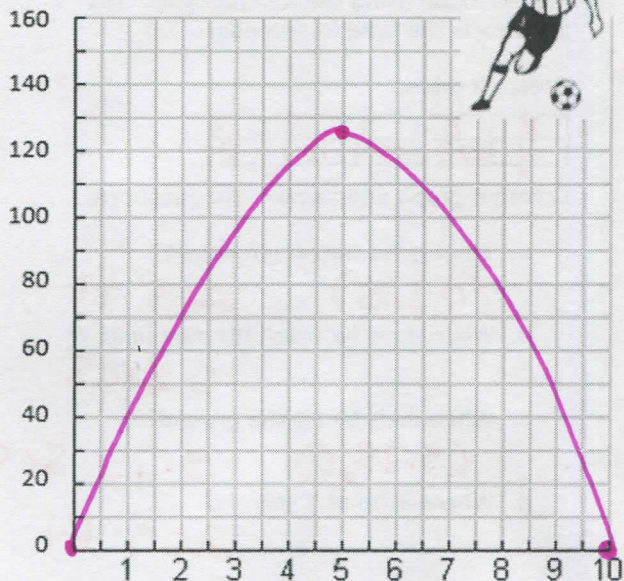


5. A soccer ball is kicked from the ground with an initial velocity of 49 meters per second. The height from the ground in meters can be found using the equation $y = -4.9x^2 + 49x$, where x is the time in seconds.

Create a table:

x	0	1	2	3	4	5
y	0	44.1	78.4	102.9	112.6	127.5
	6	7	8	9	10	
	117.6	102.9	78.4	44.1	0	

- a. What is the maximum height?
 $(5, 123) \rightarrow \approx 123$ m
- b. When does it reach its max height?
 5 sels
- c. When does it hit the ground?
 $(10, 0)$ 10 sels
- d. What is the height at 3 seconds and 7 seconds? Why is it the same?
 102.9 m; going \uparrow & back \downarrow



Window
-10
10
-7
7

Window
-5
10
0
80
5

Window
0
10
0
160
10

6. A flare is launched from a life raft with an initial velocity of 144 feet per second. The height from the ground in feet, h , can be found using the function $h(t) = -16t^2 + 144t + 0$, where t is the time in seconds. Create a table:

x	0	1	2	3	4	5
y	0	128	224	288	320	320

6	7	8	9
288	224	128	0

Create a graph and answer the questions:

- a. What is the maximum height?

$(4.5, 324) \rightarrow 324 \text{ ft}$

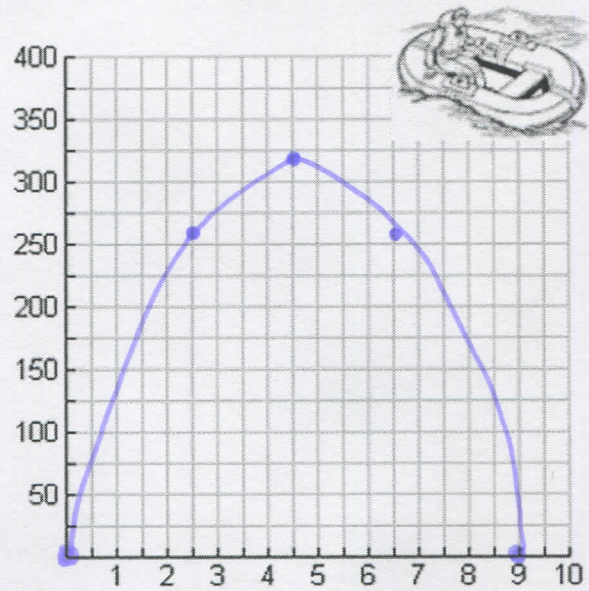
- b. When does it reach its max height?

4.5 secs

- c. When does it hit the ground?

9 secs

- d. twice @ 2.5 secs & 6.5 secs



7. A model rocket will be launched into the ocean from a hill 80 feet above sea level. Its initial velocity is 64 feet per second. The rocket's distance s , above sea level at any time, t , is found by the equation $s = -16t^2 + 64t + 80$. Create a table:

x	0	1	2	3	4	5
y	80	128	144	128	80	0

- a. What is the maximum height?

$(2, 144) \rightarrow 144 \text{ ft}$

- b. When does it reach its max height?

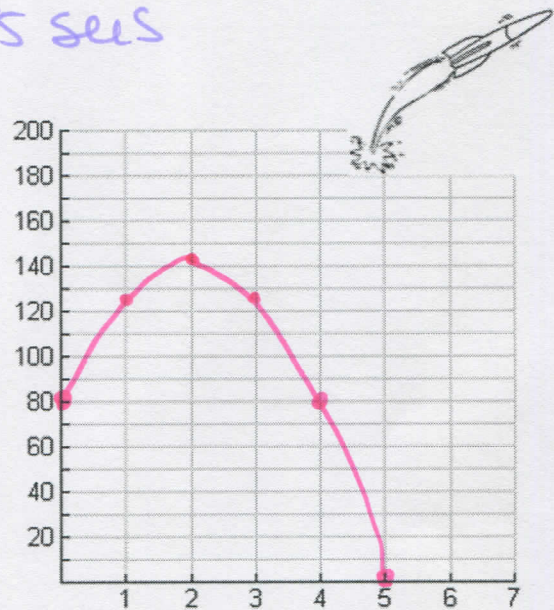
2 secs

- c. When does it hit the ground?

5 secs

- d. What is its height at 1 and 3 seconds? Why is it the same?

128 ft; launched \uparrow then comes back \downarrow



CYU Reflection: How far can you go: basic, intermediate, or advanced?

Rate your mastery level!

How confident are you with the skills this CYU covered? Circle the score you would give yourself.

