Unit 7B Day 12: Using Quadratic Graphs and Tables

Focus Question: What information can I learn from a quadratic graph or table?

A: Important Points

While all points on a graph give you information about the situation, some points are more important (give more critical information) than others.

1. What are the most important points on a quadratic graph?

Vertex (min or max) highest or lowest pt. ; *y values change from ↑ to ↓*

y int : where graph touches y-axis : x is 0

x-int(s) : where cross x-axis : y is 0

2. How do you find each point on a graph?

3. How do you find each point on a table?

B. Any situation that involves jumping/throwing/hitting/kicking/shooting something into the air will create a quadratic. Hugo and Rose were playing tennis and Hugo lobbed the ball up to Rose. The height of the ball based on the time it has been in the air is represented in the table below.

t (in seconds)	$h(t)$ in meters
0	1
0.5	6.775
1	10.1
1.5	10.975
2	9.4
2.5	5.375
3	-1.1

1. What point tells you the height of the ball when it was hit?

y int

2. How high was the ball when it was hit? **1 meter**

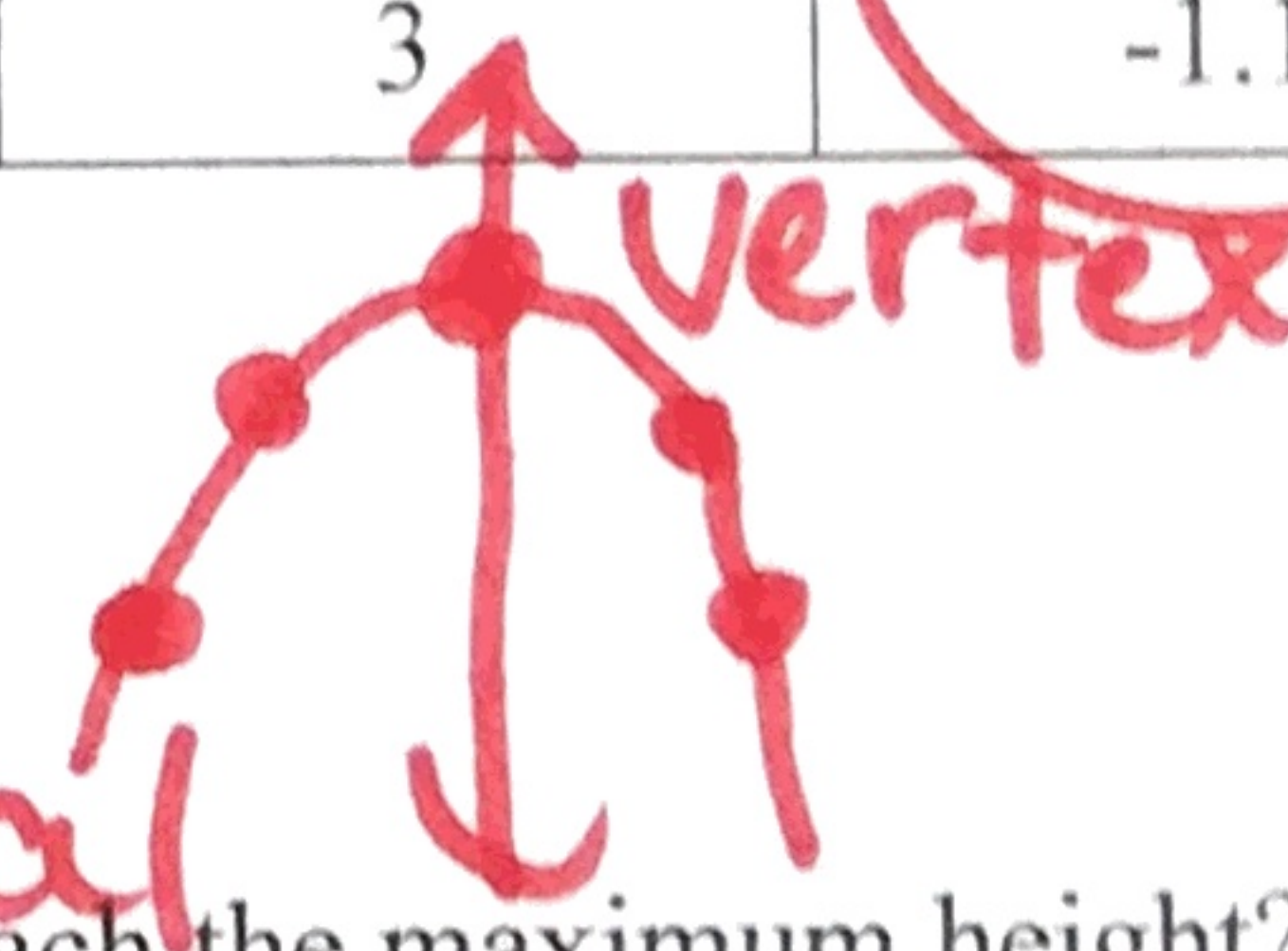3. What point tells you the maximum height the ball reached?

vertex

4. Which part of the coordinate represents the maximum height reached?

y coordinate

5. What is the approximate maximum height the ball reaches? How can you tell it's the approximate and not exact? **bk the 10.975m. table is not symetrical**

6. Which part of the maximum coordinate represents the length of time to reach the maximum height?

x coord.

7. Approximately how long was the ball in the air when it reached its maximum height?

1.5 sec.

8. What is the name of the point that indicates when the ball hits the ground? **(h(t)=0)**

x intercept

9. Approximately how long does Rose have to hit the ball before it hits the ground?

a little less than 3 sec.

C. Other situations that create quadratics are attempts to maximize profits. Prices that are too low create great sales figures, but the company has to spend more money to produce more items. Prices that are too high create few sales and the company has spent money on a product that is not selling, meaning too much waste.

A toy company is manufacturing a new toy and trying to decide on a price that maximizes profits. The graph below represents profit (P) in millions of $ expected to be generated by each price of a toy (x) in $.

1. What is the maximum expected profit?

   $165 million

2. At what price should they sell the toy to make the maximum profit?

   $6

3. What is the minimum price the company needs to charge in order to make a profit?

   $2

4. What is the maximum price the company can charge and still make a profit?

   $10
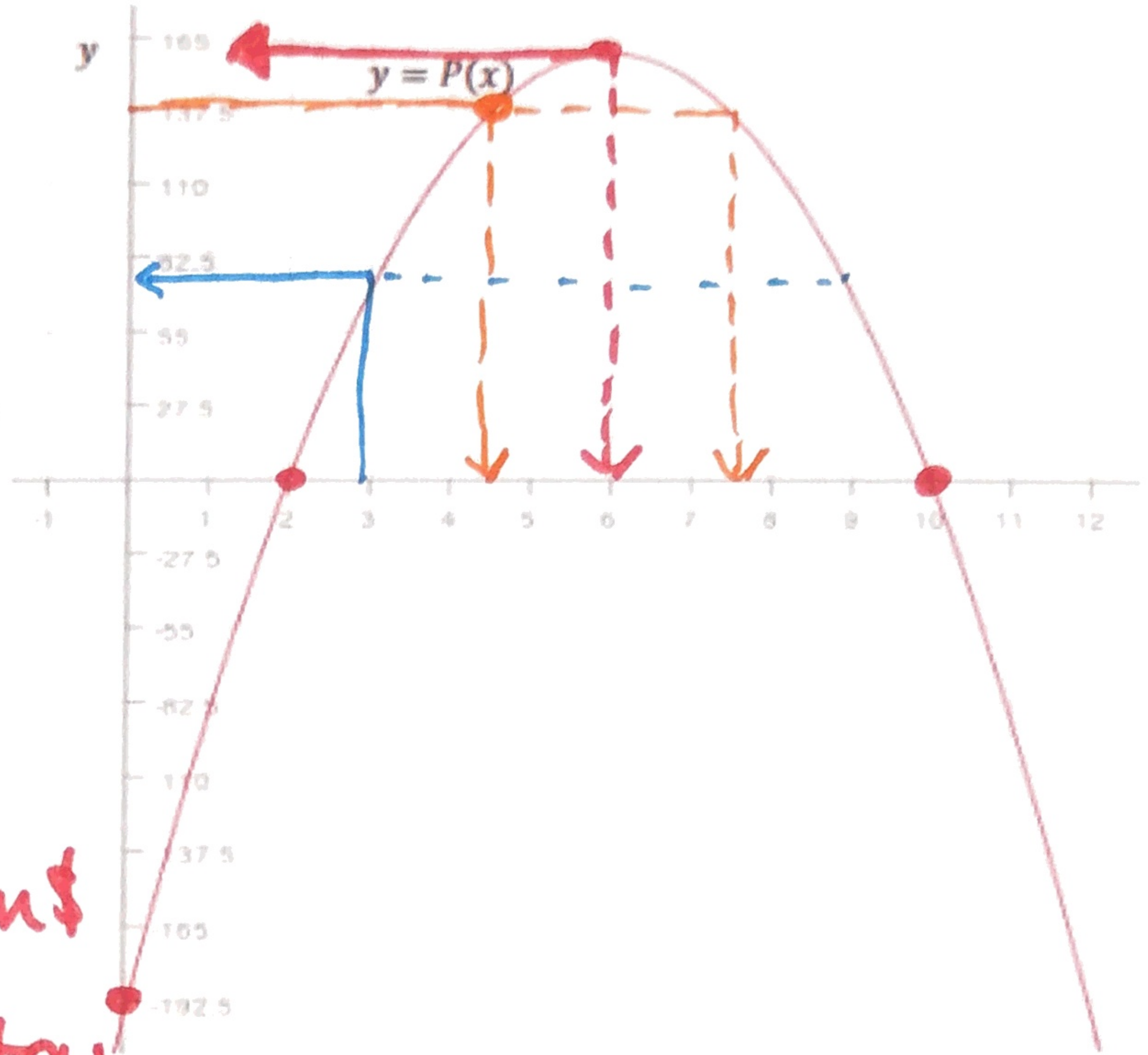
5. What is P(0)? What does this represent?

   y int   −192.5 million $
   The cost to make the toy

6. Estimate P(3). What does this point represent?

   If they sell the toy for $3 they make $82.5 profit

7. What is P(x) = 137.5? What do these points represent?

   Selling the toy at both $7.50 or $4.50 will get profit of $137.5 million

D. Using the Calculator
A calculator can be used to find all of these points. As we go through the unit you may use a calculator to CHECK your answer(s). You are required to algebraically show how to arrive at the answer otherwise you will not receive credit.

The equation for a school rocket from a project that was shot up into the air off the roof is
$h(t) = -4.9(t - 13)^2 + 840$ where h is the height in meters and t is the time in seconds since launch.

1. What point represents the height of the roof?

2. To find this on the calculator you _____

3. How tall was the building?

4. What does the vertex represent?

5. To find this on the calculator you _____

6. When did the rocket reach its highest point? _____ How high did the rocket go? _____

7. What point would represent how long the rocket was in the air?

8. To find this on the calculator you _____.

9. When did the rocket hit the ground?