Algebra 1R – Mr. Bo
Unit 11 – Day 2 Notes

Name:_____
Date:_____

More Quadratic Graphs & Second Differences

Problem 1:

A football is thrown into the air from a height of 6 feet with an initial vertical velocity of 50 feet per second. The function $g(t) = -16t^2 + 50t + 6$ represents the height of the football, $g(t)$, t seconds after it was thrown.

1. What is the y-intercept? What does it represent in the scenario?

(0,6) the initial height of the football. the football starts at a height of 6 ft.

2. What are the x-intercepts? What do they represent in the scenario?

(-.12, 0) has no meaning in the problem, because time can't be negative.

(3.2, 0) 3.2 is the time it take to reach a height of 0. (hit the ground)

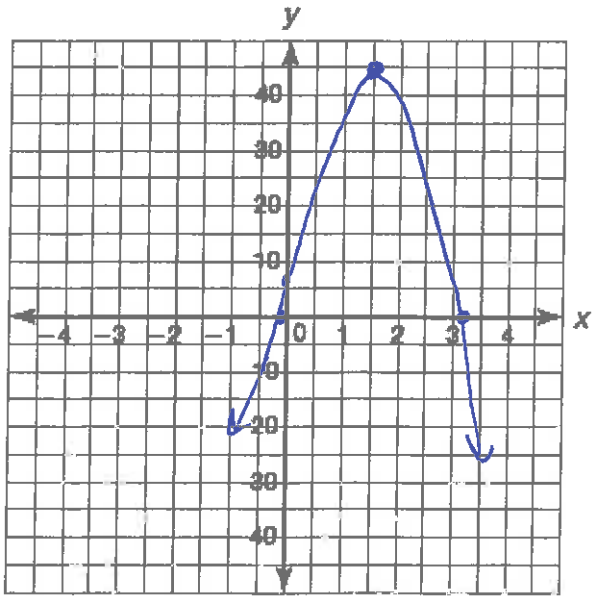
3. What is the turning point? Is the turning point a minimum or maximum?

(1.5, 45) is a maximum.

4. **Zeros** – The x-coordinate of the x-intercepts. They are the same as the Roots.
What are the zeros of the quadratic?

$x = -0.12$ and $x = 3.2$

5. Use the intercepts and turning point to graph the quadratic on the grid below.



Problem 2: Interval Notation

Use "[" or "]" to represent a filled in circle ($\leq or \geq$).

Use "(" or ")" to represent an open circle (< or >).

1. Use interval notation to represent each described interval.

a. All real numbers greater than 4, but less than or equal to 10.

$(4, 10]$

open circle

closed circle

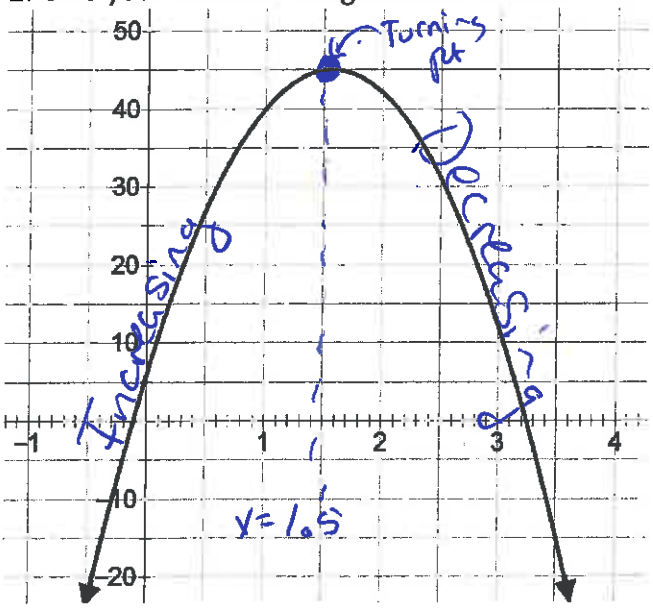
b. All real numbers less than or equal to 8.

$(-\infty, 8]$

c. All real number greater than -2 and less than 0.

$(-2, 0)$

2. Give your answers using interval notation.



a. What is the domain of the function?

Domain is all real numbers (x-values)

$(-\infty, \infty)$

b. What is the range of the function?

Range (y-values) are all Real #'s less than or equal to 45

$(-\infty, 45]$

c. Over what interval is the function increasing?

$(-\infty, 1.5)$

d. Over what interval is the function decreasing?

$(1.5, \infty)$

Problem 3: Second Differences

You can distinguish a linear table of values from a quadratic table of values by analyzing the first and second differences.

First, make sure that the x values all increase by 1.

First Differences – Subtract consecutive y values.

Second differences – Subtract consecutive first differences.

x	y	First Differences	Second Differences
−1	10	-2	
0	8		0
1	6	-2	
2	4	4-6 = -2	0
3	2	2-4 = -2	

Linear Functions will have constant First Differences and 0 Second Differences

Quadratic Functions will have changing First Differences and constant Second Differences.

1. Does the table above represent a linear or quadratic function?

Linear function.

2. Describe the type of function represented in the table, based on the first and second differences.

a.

x	y	First Differences	Second Differences
−2	−6	3	
−1	−3		0
0	0	3	
1	3		0
2	6	3	

Linear

b.

x	y	First Differences	Second Differences
−1	1	−1	
0	0		4
1	3	3	
2	10		4
3	21	7	
		11	

Quadratic