

DO NOW

Name 3 ways to find the axis of symmetry.

1. $x = \frac{-b}{2a}$
2. Graph $\rightarrow$ Look for the axis of symmetry
3. Table $\rightarrow$ Look for special value for x

8.5 Graphing Quadratic Functions - Day 2

Analyzing a function:

- axis of symmetry
- vertex, or turning point
- determine if the vertex is a maximum or minimum
- y-intercept ($x=0$)
- roots $\rightarrow$ use table ($y=0$)
 $\rightarrow$ use graph (x -intercepts)
- describe the type of roots
- end behavior (opens up or down)
- determining intervals for increasing/decreasing
 $\rightarrow$ read left to right
 $\rightarrow$ increasing $\rightarrow$ uphill
 $\rightarrow$ decreasing $\rightarrow$ downhill
 $\rightarrow$ use inequalities

For each function, find:

- a. Find the vertex and axis of symmetry.
- b. Determine if the vertex is a minimum or maximum.
- c. Find the y-intercept.
- d. Describe the end behavior.
- e. Sketch the graph.
- f. Identify the roots.
- g. Describe the type of roots
- h. State increasing and decreasing intervals.

1. $y = x^2 + x + 3$

a. $x = \frac{-b}{2a}$

$x = \frac{-1}{2} \leftarrow \text{axis of symmetry}$

$y = x^2 + x + 3$

$y = \left(\frac{-1}{2}\right)^2 - \frac{1}{2} + 3$

$y = \frac{1}{4} - \frac{1}{2} + 3$

$y = \frac{1}{4} - \frac{2}{4} + 3$

$y = -\frac{1}{4} + 3$

$y = 2\frac{3}{4}$

$\left(-\frac{1}{2}, 2\frac{3}{4}\right) \leftarrow \text{vertex}$

b. minimum

c. $y = x^2 + x + 3$

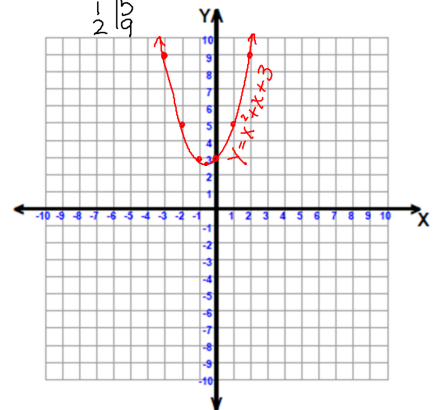
$y = 0^2 + 0 + 3$

$y = 3$

d. opens upwards

e. x	y
-3	6
-2	5
-1	3
-0.5	2.75
0	3
1	4
2	6

- f. no roots
 g. no real roots
 h. increasing: $x > -\frac{1}{2}$
 decreasing: $x < -\frac{1}{2}$



2. $y = -x^2 - 2x + 3$

a. $x = \frac{-b}{2a}$

$x = \frac{2}{2(-1)}$

$x = -1 \leftarrow \text{axis of symmetry}$

$y = -(-1)^2 - 2(-1) + 3$

$y = -1 + 2 + 3$

$y = 4$

$(-1, 4) \leftarrow \text{vertex}$

b. maximum

c. $y = -x^2 - 2x + 3$

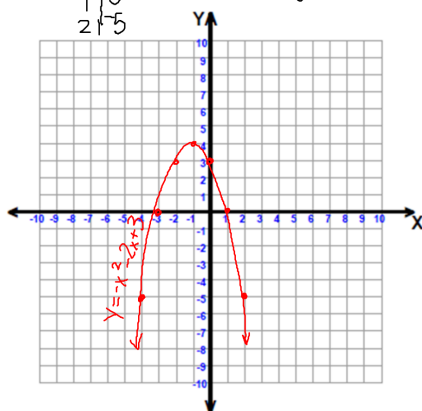
$y = -(0)^2 - 2(0) + 3$

$y = 3$

d. opens down

e. x	y
-4	5
-3	0
-2	3
-1	4
0	3
1	0
2	-5

- f. $x = -3$ and $x = 1$
 g. real and unequal
 h. increasing: $x < -1$
 decreasing: $x > -1$



HOMEWORK

Worksheet - HW 8.5 - Day 2

Graphing Quadratic Functions