

Name: _____

Notes

Date: _____

Graphing Quadratic Equations

UNIT QUESTION: How are real life scenarios represented by quadratic functions?

Today's Question: How do we graph quadratics in standard form? MCC9-12.F.IF.8

Steps for Graphing Quadratic Equations

1. Put the equation in standard form: $y = ax^2 + bx + c$
2. Identify the values of a, b, & c.
3. Find the axis of symmetry: $x = \frac{-b}{2a}$
4. Construct a table of values for x and y. You need a total of 5 points!
5. Plot the points and connect them with a U-shaped curve & arrows.

Examples:

Graph each using a T-chart. Use a dotted line to graph the axis of symmetry.

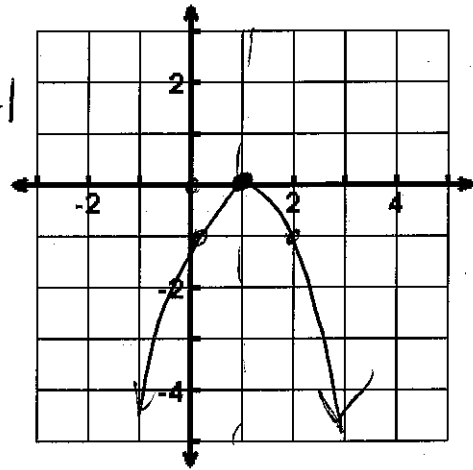
1. $y = -x^2 + 2x - 1$ axis of symm

$a = -1$
 $b = 2$
 $c = -1$

x	y
1	0
2	-1
0	-1
1	
3	

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

$-(1)^2 + 2(1) - 1$
 $-1 + 2 - 1 = 0$



Extrema: max

Domain: $(-\infty, \infty)$

X-intercepts: $(1, 0)$

Increasing: $(-\infty, 1)$

Rate of Change $0 \leq x \leq 2$: -1

$(0, -1)(2, -1)$

$r.o.c = \frac{-1 - (-1)}{2 - 0} = \frac{-2}{2} = -1$

Axis of Symmetry: $x = 1$

Range: $(-\infty, 0]$

Y-intercept: $(0, -1)$

Decreasing: $(1, \infty)$

Rate of Change $1 \leq x \leq 3$: -2

$-(3)^2 + 2(3) - 1$ $(1, 0)$

$-9 + 6 - 1 = -4$ $(3, -4)$

$r.o.c = \frac{-4 - 0}{3 - 1} = \frac{-4}{2} = -2$

2. $y = x^2 - 6x + 5$

vertex

x	y
3	-4
4	-3
2	-3
0	5
5	0

$a = 1$

$b = -6$

$c = 5$

$(3)^2 - 6(3) + 5$
 $9 - 18 + 5$

$(1)^2 - 6(1) + 5 =$
 $1 - 6 + 5$

Extrema: min

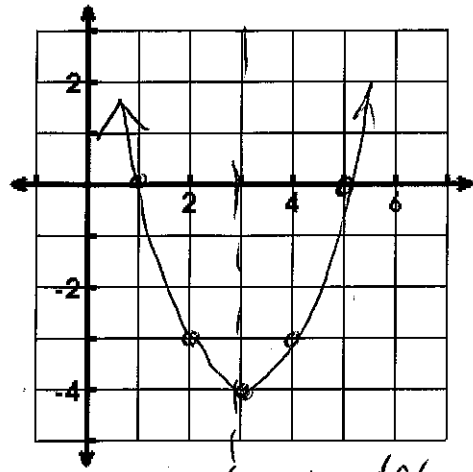
Domain: $(-\infty, \infty)$

Zeroes: $x = 1, 5$

Increasing: $(3, \infty)$

Rate of Change $0 \leq x \leq 2$: -4
 $(0, 5)(2, -3)$

$roc = \frac{-3 - 5}{2 - 0} = -8$



Axis of Symmetry: $x = \frac{6}{2(1)} = 3$

Range: $[-4, \infty)$

Y-intercept: $(0, 5)$ $0^2 - 6(0) + 5$

Decreasing: $(-\infty, 3)$

Rate of Change $4 \leq x \leq 5$: 3

$(4, -3)$ $(5)^2 - 6(5) + 5$
 $(5, 0)$ $25 - 30 + 5$

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

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

$a = -1$

$b = -2$

$c = 3$

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

$-(2)^2 - 2(2) + 3$
 $-4 - 4 + 3$

Extrema: max

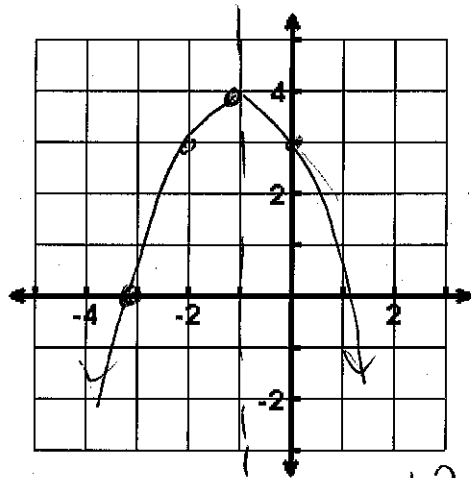
Domain: $(-\infty, \infty)$

Roots: $x = -3, 1$

Increasing: $(-\infty, -1)$

Rate of Change $0 \leq x \leq 2$: -4
 $(0, 3)(2, -5)$

$roc = \frac{-5 - 3}{2 - 0} = -8$



Axis of Symmetry: $x = \frac{-2}{2(-1)} = -1$

Range: $(-\infty, 4]$

Y-intercept: $(0, 3)$

Decreasing: $(-1, \infty)$

Rate of Change $-3 \leq x \leq 1$: 0

$(-3, 0)(1, 0)$

$-(-3)^2 - 2(-3) + 3$

$-9 + 6 + 3$

$-(1)^2 - 2(1) + 3 = -1 - 2 + 3 = 0$

$-5 + 5 = 0$
 $roc = \frac{0 - 3}{5 - 4}$