

Name: _____

Math 20-2

Quadratic Properties Part II

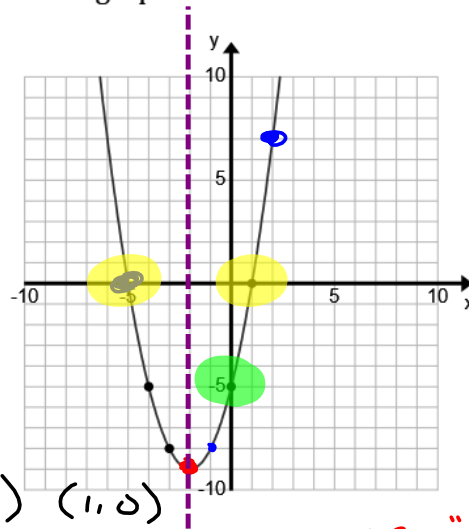
Objective: Identify properties of quadratic functions: vertex, x-intercepts, y-intercept, an equation for the axis of symmetry, **Domain and Range.**

1. Given: $y = x^2 + 4x - 5$ $x = -5$ $y = (-5)^2 + 4(-5) - 5$
 a) Complete the table and add points to the graph

x	y
-5	0
-4	-5
-3	-8
-2	-9
-1	-8
0	-5
1	0
2	7

min pt

vertex



$(2)^2 + 4(2) - 5 = 4 + 8 - 5$

- b) Label the x-intercepts. $(-5, 0)$ $(1, 0)$
 c) Label the y-intercept. $(0, -5)$
 d) The lowest point is called the 'vertex'. Label the vertex.
 e) Draw in the line of symmetry. What point will this line always pass through?
 f) **Domain** is the list of x-values that we can put into the equation.
Range is the list of y-values that are generated by the x-values.

CALC "MIN"

vertex

x is an element of the real numbers

Domain: we want to show x can be any number, no restrictions.

math language: $x \in \mathbb{R}$

no = zero
no $\sqrt{\text{neg}}$

Range: we want to show the y-values are -9 or bigger.

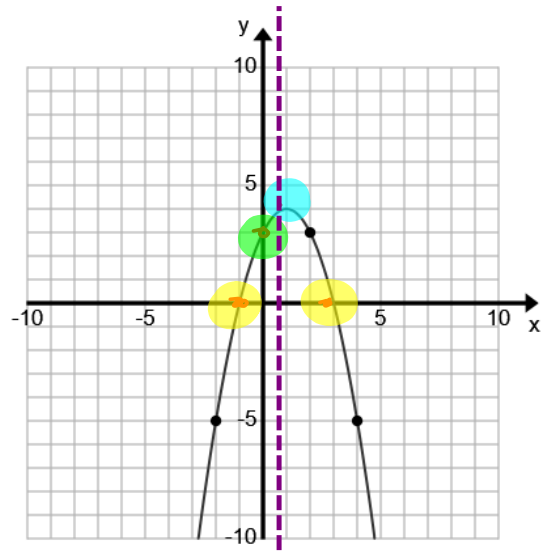
math language: $y \geq -9$

1.3 Quad Properties II. Sept 2020

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

a) Complete the table and add points to the graph

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



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

b) Label the x-intercepts.

c) Label the y-intercept. $(0, 3)$

d) The highest point is also called the 'vertex'. Label the vertex. $V(1, 4)$

e) Draw in the line of symmetry. Write the equation for the axis of symmetry: $x = 1$

max = 4

f) Domain: we want to show x can be any number, no restrictions.

math language: $x \in \mathbb{R}$

no \div zero
no $\sqrt{\text{neg}}$

Range: we want to show the y-values are 4 or smaller..

math language:

~~$y \geq$~~

$y \leq 4$

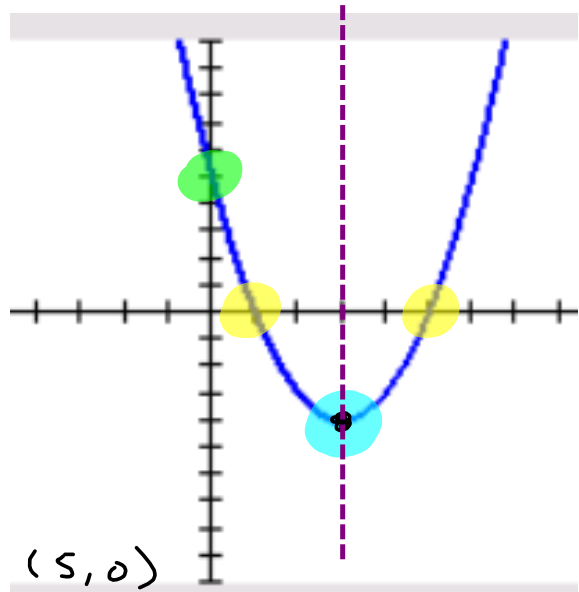
* CALC \rightarrow MAX
 \rightarrow ZEROS

1.3 Quad Properties II. Sept 2020

3. Given: $y = x^2 - 6x + 5$

a) Complete the table; plot points and graph

X	Y ₁
-1	12
0	5
1	0
2	-3
3	-4
4	-3
5	0
6	5
7	12



b) Label the x-intercepts. $(1, 0)$ $(5, 0)$

c) Label the y-intercept. $(0, 5)$

d) Label the vertex. $(3, -4)$ "CALC" minimum

e) Draw in the line of symmetry. Write the equation for the axis of symmetry: $x = 3$

f) Write the Domain in words and in 'math language'.

no restrictions $x \in \mathbb{R}$

Write the Range in words and in 'math language'.

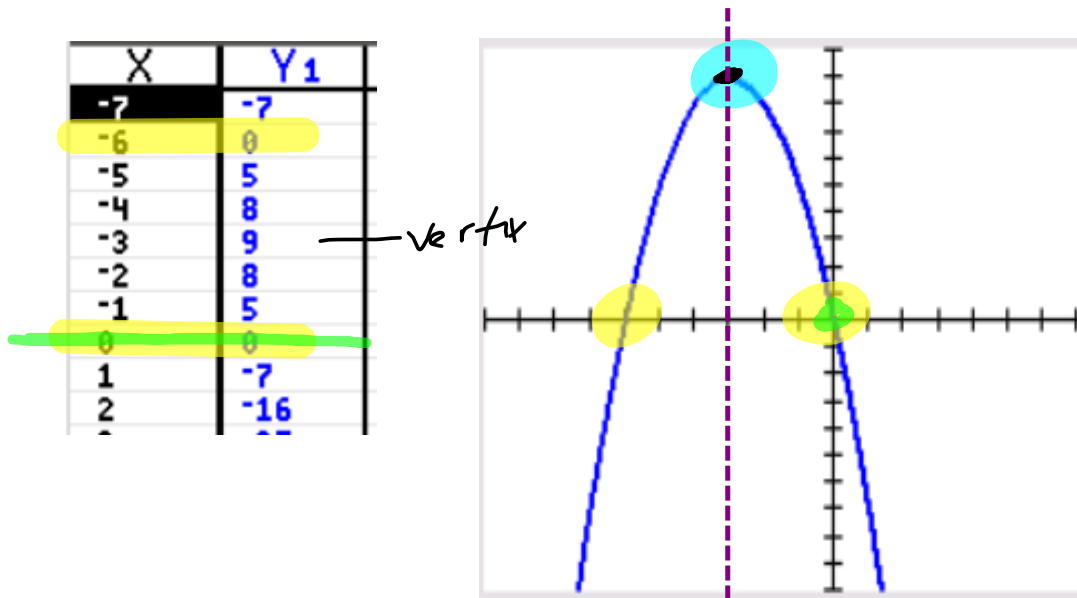
minimum $y = -4$ $y \geq -4$

g) Calculator Skills: Find the "zeroes" and the "minimum value"
practice

1.3 Quad Properties II. Sept 2020

4. Given: $y = -x^2 - 6x$

a) Complete the table; plot points and graph



b) Label the x-intercepts.

$(-6, 0)$ and $(0, 0)$

c) Label the y-intercept.

$(0, 0)$

d) Label the vertex.

$V(-3, 9)$

e) Draw in the line of symmetry. Write the equation for the axis of symmetry:

$$x = -3$$

f) Write the Domain in words and in 'math language'.

$$x \in \mathbb{R}$$

Write the Range in words and in 'math language'.

$$\text{MAX } y = 9$$

$$y \leq 9$$

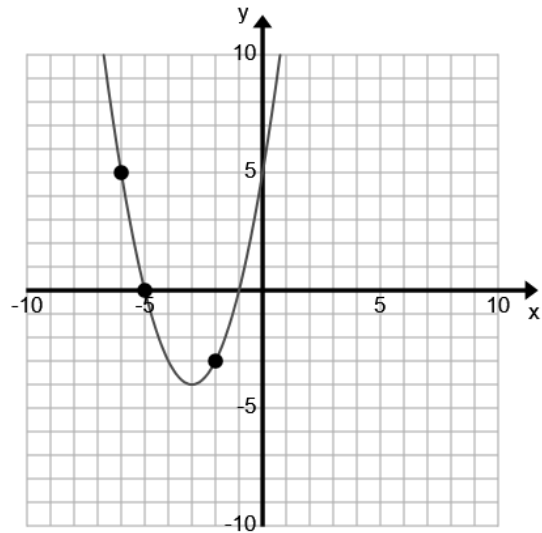
~~g) Calculator Skills: Find the "maximum value".~~

1.3 Quad Properties II.Sept2020

5. Reading Graphs: Find properties of a quadratic function from just the graph.

a) Complete the table (using symmetry); add points to the graph.

x	y
-6	5
-5	0
-4	
-3	
-2	-3
-1	
0	



- b) Label the x-intercepts.
- c) Label the y-intercept.
- d) Label the vertex.
- e) Draw in the line of symmetry. Write the equation for the axis of symmetry:
- f) Write the Domain in words and in 'math language'.

Write the Range in words and in 'math language'.

1.3 Quad Properties II.Sept2020

6. Applying properties to 'Problem Solving'.



At a fountain the path of water from one of the jets can be defined by the function: $f(x) = -0.12x^2 + 3x$.

x = horizontal distance from the opening in the ground in feet

$f(x)$ = height of the spray water in feet.

- a) Find a window that will allow you to see the path of the water.
- Quadrant one is where you want to see the water.
 - For the scale (count by), make the minimum value one negative scale factor.

X:[min, max, scale] = [_____, _____, _____]

Y:[min, max, scale] = [_____, _____, _____]

- b) Draw a sketch of the water path using your window.
- c) What is the **maximum** height of the water arch?
- d) How far from the opening in the ground does the water reach? (height = **zero**)

