Secondary 2
lesson 6.3

Story Problems with Quadratics and Solving with a Calculator.

Objective:

- Use a calculator to graph and solve quadratic equations
- In real life scenarios, interpret graphs and explain what they mean in the given context.

1

Using a calculator

We will next use a calculator to find the x and y intercepts, the vertex, and explain if it is a maximum or minimum. To do this we need to memorize the calc menu:

1) Value

2) Zero

3) Minimum

4) Maximum

5) Intersect

2

Using a calculator

- Given: $y = x^2 - 4x + 5$

Find the x and y intercepts, the vertex, explain if it is a maximum or minimum:

3

A graph helps us understand where a function is Increasing and decreasing.

To see where a function is increasing and decreasing, find the x value of the vertex. This is defines where the equation changes from increasing to decreasing.

Examples: Using your calculator state where the graph is increasing and decreasing.

1. $y = x^2 - 4x + 2$

4

Using a calculator

Given $f(x) = -2x^2 + 8x - 4$ State or find:

1. Is the graph opening up or down?
2. Is it a maximum or minimum?
3. Find the y- intercept.
4. Find the x- intercepts.
5. Find the vertex.
6. The graph is increasing and decreasing: x≤ $and\ x \geq$

5

Using a calculator

Given $f(x) =$ (x-3)(2x+5) State or find:

1. Is the graph opening up or down?
2. Is it a maximum or minimum?
3. Find the y- intercept.
4. Find the x- intercepts.
5. Find the vertex.
6. The graph is increasing and decreasing: x≤ $and\ x \geq$

6

A graph helps us find the DOMAIN and RANGE.

DOMAIN: Is the set of x-values, or the input

RANGE: Is the set of y-values, or the output.

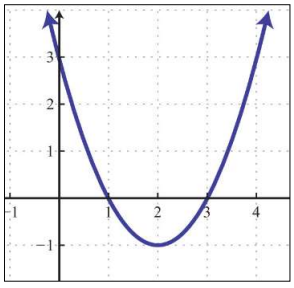
For Quadratic Equations/Parabolas (**Unless it is a problem situation/story problem**) DOMAIN will always be the set of all Real Numbers or $(-\infty, \infty)$

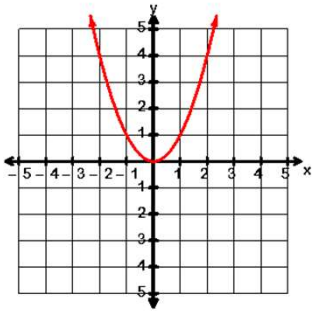
RANGE will always be (min, ∞) or $(-\infty, \max)$.
It may also be written as an inequality like: y < ?

***You need to find the value of max or min to use with the Range.

7

What are the Domain and Range for these graphs? *Look for where they stop.*





8

Real Life Scenarios

To solve these questions you must graph the function on the calculator and answer all questions in a sentence form.

1. *A bird is descending toward a lake to catch fish. The bird's flight can be modeled by the equation* $\boldsymbol{h(t) = t^2 - 18t + 35}$, *where h(t) is the bird's height above the water in inches and t is the time in seconds since you saw the bird. Graph the function. (window: xmax=20 and ymin=-50)*

a. *Draw a sketch:*

b. *Find the vertex:*

c. *What does the vertex represent?*

d. *What are the Domain and Range?*

9

2. *A military pilot fires a test missile whose path can be modeled by the equation* $\boldsymbol{f(x) = -(x - 20)(x + 3)}$, *where f(x) is the height of the missile in miles and x is the number of seconds since the missile was fired. Graph the function. (window: xmax=50, ymax=200)*

a. *Draw a sketch:*

b. *Find the x-intercepts:*

c. *What do intercepts represent?*

d. *What are the domain and range?*

10