# WELCOME

## Math 2

**Chapter 12: Quadratics: Domain, Range, Intercepts, and Intervals**

**Last Night's HW:**

**Tonight's HW:**

# Warm Up

| x | f(x) |
|---|---|
| -3 | |
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |

1. Complete the table for: $f(x) = x^2 - 3$

2. Distribute & put in standard form: $f(x) = 5 + x(6 - x)$

3. Identify a, b & c: $f(x) = -x^2 - 20$

# Chapter 12 Section 3 Learning Target

**Given a quadratic function I can determine the domain, range, intervals of increase and decrease, and identify the zero(s).**

# Interval Notation

**Interval:**

| Open Interval | Closed Interval | Half Open/Closed |
| --- | --- | --- |
| | | |
| describes… | describes… | describes… |
| | | |

**Note on $\infty$:**

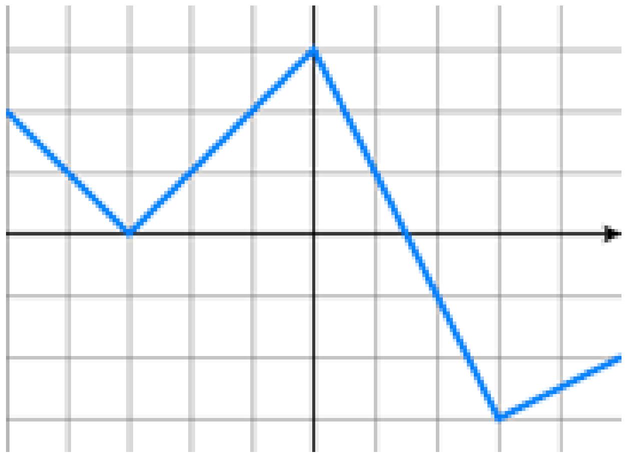
**Use interval notation to describe the interval in which:**

a) all numbers are more than 7.

b) all numbers are less than or equal to -5.

c) any real number.

d) The function is Increasing/Decreasing



# Interval Notation

| Open | Closed | Half Open/Closed |
|---|---|---|
| Used on intervals that are between but not equal to. | Used on intervals that are between and equal to the endpoints. | A combination of open and closed ends to an interval. |

Suppose you launch a water balloon in a sling from ground level. You can model the motion of the balloon using a *vertical motion model.*

$$f(t) = -8t^2 + V_o t + h_o$$

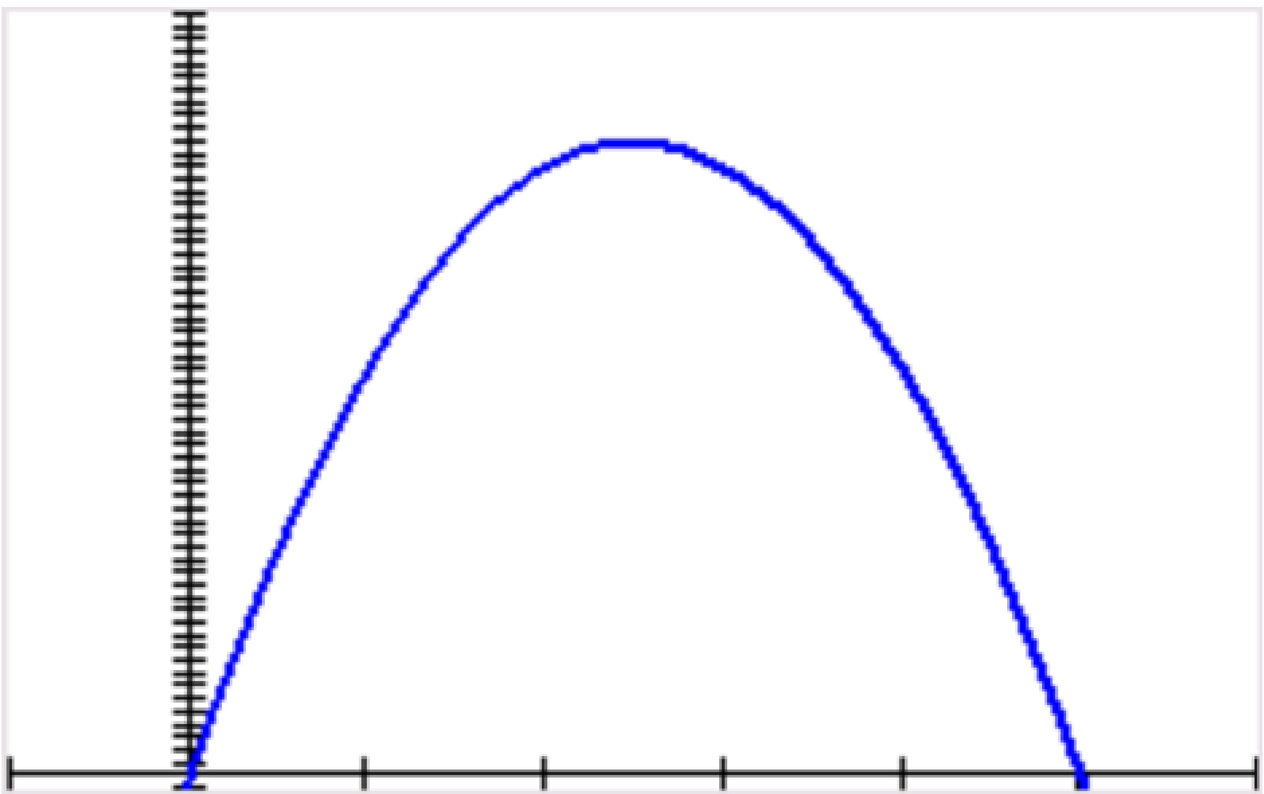
$V_o$:

$h_o$:

1. Write a function for a balloon that is launched from a height of 0ft and a velocity of 80ft/s.

2. The following graph is of the function you wrote above.

a) What function family does the function belong to? What is the domain/range?



b) What is the graphs Max/Min?

c) What does it represent?

d) What are the graphs Zeroes (x-int)?

e) What do they represent?

**Domain**:

**This is the set of *possible* inputs. (independent)**

**Range**:

**This is the set of *related* outputs . (dependent)**

**Range**

**Ex:**

**Water in Leaky Pool**

**Domain**

**Ex:**

**Time in Hours**

# Zeroes & Y-Intercepts

**x-intercepts zeros:**

**These *are the point(s)* where the parabola crosses the x-axis.**

**(y-value always equals zero)**

$\boxed{(-1, 0) \,\&\, (4, 0)}$

$f(x) = x^2 - 2x - 3$

**y-intercepts:**

**This *is the point* where the parabola crosses the y-axis.**

**(x-value always equals zero)**

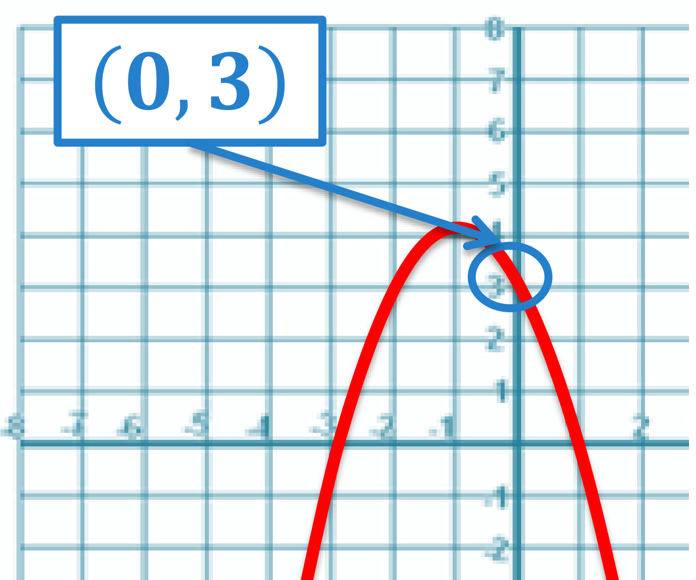
$\boxed{(0, -4)}$

# How to Find The y-intercept

For every parabola there is exactly one y-intercept

## Graphically

Look for the place the parabola crosses the y-axis .




## Table

Look for the point where the x-value is equal to zero

| x | f(x) |
|---|---|
| -2 | 0 |
| -1 | 3 |
| 0 | 4 |
| 1 | 3 |
| 2 | 0 |

$(0, 4)$

## Formula

We can find the y-int by plugging in zero for x

$$f(x) = x^2 - 2x - 1$$
$$f(0) = 0^2 - 2(0) - 1$$
$$f(0) = 0 - 0 - 1$$
$$f(0) = -1$$

$$\boxed{(0, -1)}$$

# How to Find The x-int’s/roots/zeros

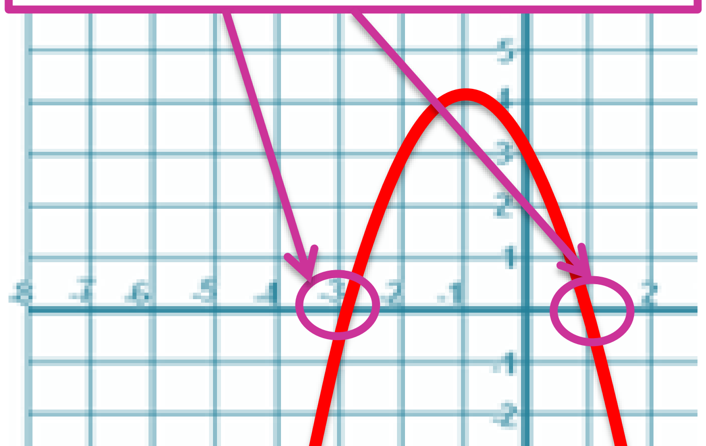
For every parabola there are either 0, 1, or 2 x-intercepts

| Graphically | Table | Formula |
|---|---|---|

**Graphically**

Look for the place(s) the parabola crosses the x-axis .

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



**Table**

Look for the point(s) where the y-value is equal to zero

| x | f(x) |
|---|---|
| -3 | 4 |
| -2 | 1 |
| -1 | 0 |
| 0 | 1 |
| 1 | 4 |

$(-1,0)$

**Formula**

Coming Soon!!!

f) On what interval is the graph increasing? What would this represent?

g) On what interval is the graph decreasing? What would this represent?