

## GEOMETRIC FUNCTIONS SUMMARY

### Definitions:

**Function** a relation where each value of the independent variable corresponds with only one value of the dependent variable

**Relation** a set of ordered pairs, values of the independent variable are paired with values of the dependent variable

**Domain** values of the independent variable ( $x$ )

**Range** values of the dependent variable ( $y$ )

**Function Notation**  $f(x) = y$

**Parent Function** simplest form of the function (without shifts)

**Absolute Value** distance from 0;  $|5| = |-5| = 5$

**Asymptote** line the gets closer and closer to a value, but never meet it. i.e.  $2^{-x}$  approaches 0

**Rational Numbers** numbers that can be expressed as a fraction

**Irrational Numbers** numbers that can *not* be expressed as a fraction  $\sqrt{2}$  or  $\pi$

**Real Numbers** either rational and irrational numbers

**Inverse Function** reverse of the original function; undoes what the original function did.

### Definition of a function

A function is a relation between a set of inputs and a set of permissible outputs with the property that each input is related to exactly one output. *X can only resolve to a single Y value.*

$$f(x) = y$$

### Inverse Functions

The inverse function is the anti-function. It resolves  $y$  back to  $x$ .

$$f(x) = y = 2-5x$$

Then the inverse function is  $f^{-1}(y) = x$

**Question: check the function  $f(x) = 5x - 2$  if,  $x = 4$ . and find the inverse function.**

**Solution:**

Function	Inverse Function
$f(x) = y = 5x - 2$ $f(4) = 5 \times 4 - 2$ $f(4) = 18$	$y = 5x - 2$ <b>Solve for <math>x</math>:</b> $x = (y+2)/5$  $f^{-1}(x) = x = (y+2)/5$ $f^{-1}(18) = (18+2)/5$ $f^{-1}(18) = 4$

### Domain and Range

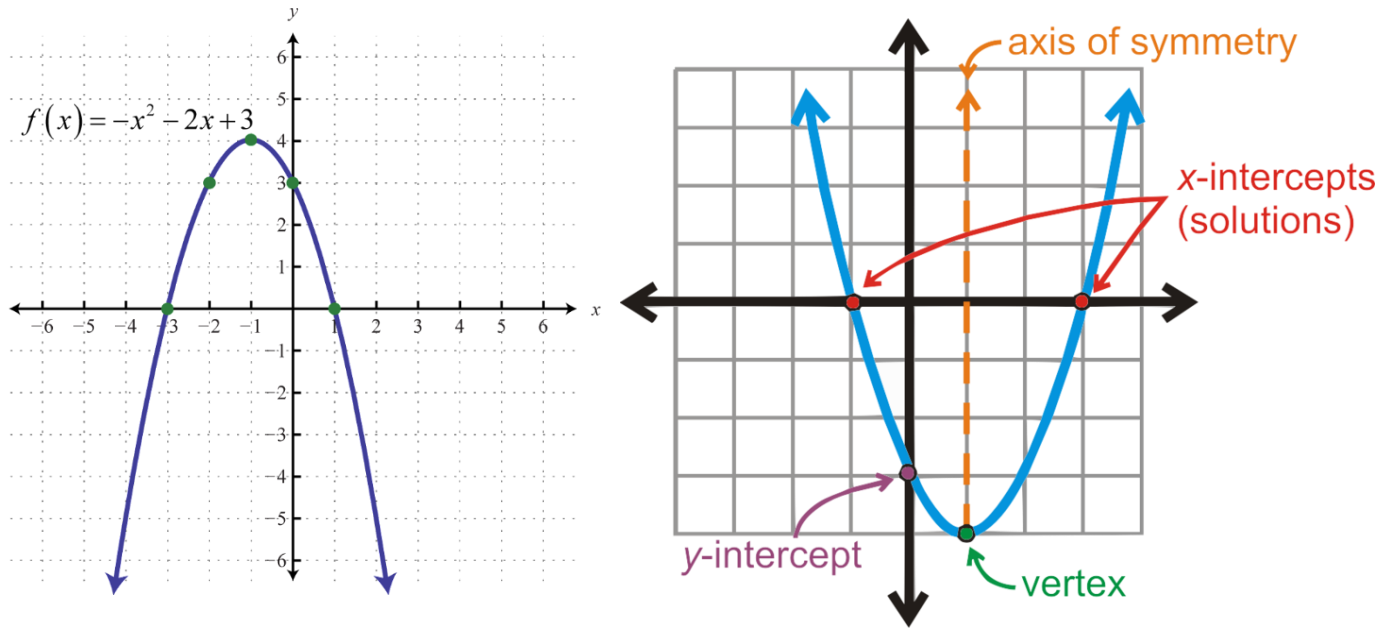
**Domain** – All of the values that go into a relation or a function are called the domain.

$$D: \{x \mid x \in \mathbb{R}\}$$

**Range** – All of the entities (**output**) which emerge from a relation or a function are called the range.

$$R: \{y \mid y \geq 0\}$$

### Graphing Quadratics (Parabolas)



### Graphing Exponentials

$y = 2^x$

All of the transformations that you learned apply to all functions, so what would the graph of  $y = 2^x + 3$  look like?

**up 3**

**right 2 down 1**

$y = 2^{x-2} - 1$

**up 1**

**Reflected over x axis**

$y = 1 - 2^x$

The block contains several graphs on a yellow background. 
 1. A graph of the base function  $y = 2^x$ .
 2. A graph of  $y = 2^x + 3$ , which is the base function shifted up by 3 units.
 3. A graph of  $y = 2^{x-2} - 1$ , which is the base function shifted right by 2 units and down by 1 unit.
 4. A graph of  $y = 1 - 2^x$ , which is the base function reflected over the x-axis and shifted up by 1 unit.
 Red arrows and text labels indicate the transformations between these graphs.