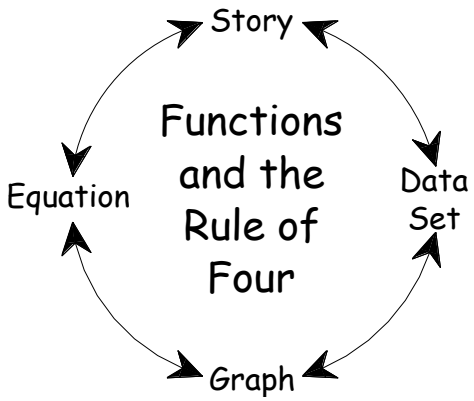
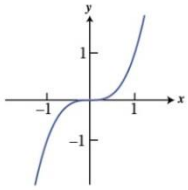


The Rule of Four

There are 4 equivalent descriptions of a Function:

Narrative	Data Set	Graph	Equation
	x | y 1 | -7 2 | 5 3 | 2 4 | 5 5 | 1		$y = f(x)$ $y = \frac{ax + b}{cx - d}$

To be or not to be a Function

Let x (input) = ID Number and y (output) = date of birth (DOB). Although 2 different people can have the same DOB, this is a function because each person (x) has exactly one DOB (y). The Domain = {all ID numbers}

Let x (input) = ID Number and y (output) = GPA. At this exact moment, this would be a function. However, over time, this would not be a function because a single person (x) could have multiple GPA's (y).

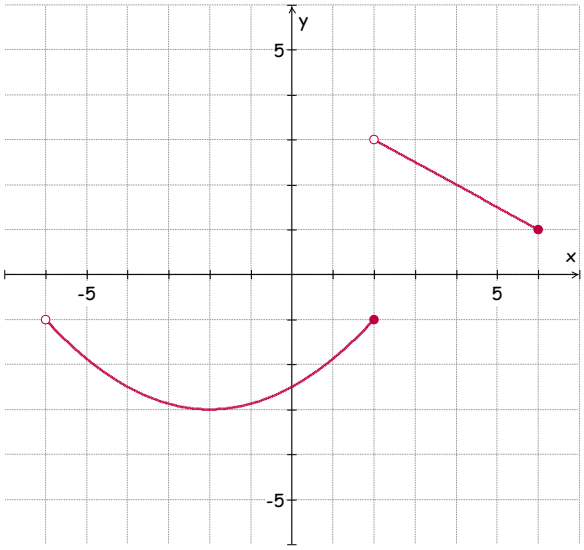
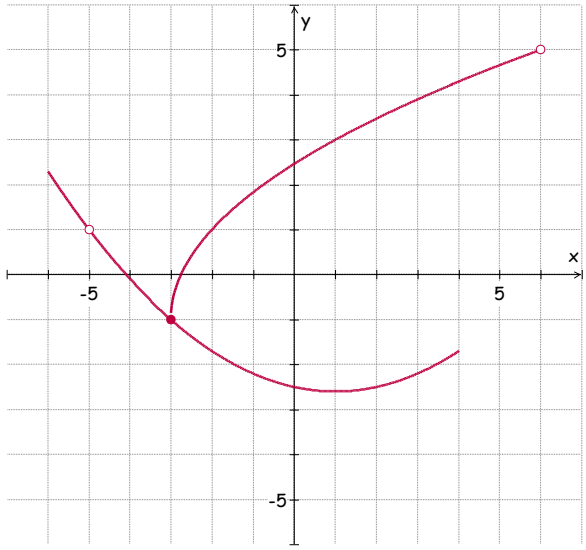
Let x (input) = License plate number and y (output) = VIN. We would expect this is a function because each vehicle (x) has exactly one VIN(y). Domain = {all License Plate numbers}

Let x (input) = License plate number and y (output) = odometer reading. We would expect this is not a function because a vehicle (x) could have different readings (y) once driving occurred.

Let x (input) = time during today and y (output) = temperature at a specific location. We would expect this is a function because at each point in time, there should be exactly one temperature reading (y). Domain = {all times: $0:00 \le x < 24:00$}

Let x (input) = sq-ft of room painted and y (output) = amount of paint used. This should be a function because each sq-ft (x) should require the same amount of paint (y). Domain: {$0 \le x \le$ room's total sq-ft}

Data Set		Data Set	
x | y 1 | 9.36 2 | 4.81 3 | 4.81 1 | 9.36 5 | 8.70	This data set is a function because for each x, there is exactly one y. It's OK that for x = 2,3 the y's are the same.	x | y 1 | 9.36 2 | 6.40 3 | 4.81 4 | 9.36 4 | 8.70	This data set is not a function because for x = 4, there are two different y-values.

Graph	Graph
	
This graph is a <u>function</u> because it passes the vertical line test (VLT). Domain = { $-6 < x \leq 7$ }	This data set is <u>not a function</u> because it does not pass the vertical line test (VLT)

Equation

$5y = 3x + 4$	This is a <u>function</u> because it can be legitimately entered into the form $y = f(x)$.
$5y^2 = 3x + 4$	This is <u>not a</u> <u>function</u> because it when solved for 'y' we get the form $y = \pm\sqrt{\frac{3x + 4}{5}}$. Hence there are two y-values for many x-values.