

## More Relations

Remember - a relation is...

a set of ordered pairs.

Look at this relation:  $\{(2,4) (3,7) (4,9) (6,11)\}$

State the domain and range of the relation.

Domain:  $\{2, 3, 4, 6\}$

Range:  $\{4, 7, 9, 11\}$

State the domain and range for each relation.

1.  $\{(2,5) (9,12) (3,8) (6,7)\}$

domain:  $\{2, 9, 3, 6\}$

range:  $\{5, 12, 8, 7\}$

2.  $\{(12,4) (3,4) (7,12) (26,19)\}$

domain:  $\{12, 3, 7, 26\}$

range:  $\{4, 4, 12, 19\}$

3.  $\{(4,3) (7,14) (16,34) (5,11)\}$

domain:

range:

Now, given the equation of the relation and the domain, find the range. (Create a t-table using the domain and equation.)

Relation:  $y = 5x$       Domain:  $\{1, 2, 3, 4\}$

$x$	$5x$	$y$	$(x, y)$
1	$5(1)$	5	$(1, 5)$
2	$5(2)$	10	$(2, 10)$
3	$5(3)$	15	$(3, 15)$
4	$5(4)$	20	$(4, 20)$

Range:  $\{5, 10, 15, 20\}$

Relation:  $y = 3x + 2$

domain:  $\{0, 1, 3, 4\}$

x	y	(x,y)

range: {

Relation:  $y = |x|$

domain:  $\{-3, -2, -1, 0, 1\}$

$x$	$y =  x $	$y$	$(x, y)$
-3	$  -3  $	3	$(-3, 3)$
-2	$  -2  $	2	$(-2, 2)$
-1	$  -1  $	1	$(-1, 1)$
0	$  0  $	0	$(0, 0)$
1	$  1  $	1	$(1, 1)$

Range:  $\{3, 2, 1, 0, 1\}$

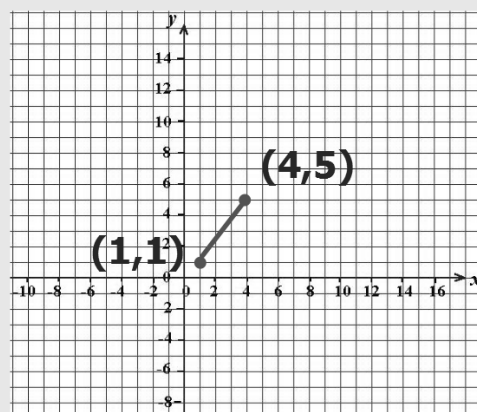
Now, let's find the domain and range from a graph.

Step 1 - Find the lowest and highest value of  $x$  on the graph. The domain is the values between these. The lowest is 1 on this graph. The highest is 4, so the domain =

$$1 \leq x \leq 4.$$

Step 2 - Do the same with the  $y$ . The range on this graph =

$$1 \leq y \leq 5.$$

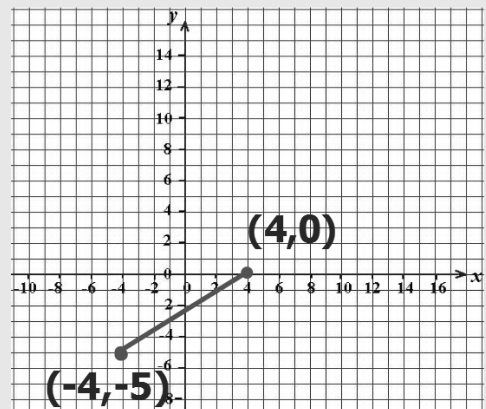


**Endpoints - (1,1) and (4,5)**

Find the domain and range.

$$\text{Domain} = \underline{-4} \leq x \leq \underline{4}$$

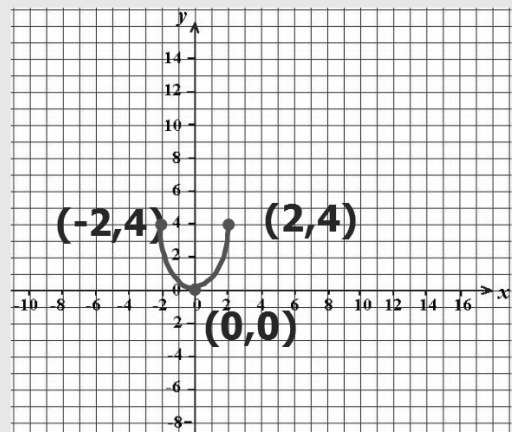
$$\text{Range} = \underline{-5} \leq y \leq \underline{0}$$



Find the domain and range.

$$\text{Domain} = \underline{-2} \leq x \leq \underline{2}$$

$$\text{Range} = \underline{0} \leq y \leq \underline{4}$$



### Writing Functions:

The output of a function is the y variable.

The input of a function is the x variable.

The solutions (y) depends on what the "x" does. So,

(  
x = independent variable  
y = dependent variable  
)

EX. Gardeners buy fertilizer according to the size of a lawn.

x = the size of the lawn (independent)

y = how much fertilizer to buy (dependent)

(depends on the size of the lawn)

**Identify the independent and dependent variable.**

**An ice rink charges \$2 per hour.**

$$y = 2x$$

**x = # of hours (independent)**

**y = cost (dependent)**

**Identify the independent and dependent variable.**

**The cost to gift wrap an order is \$1.50 per item wrapped.**

$$y = \$1.50x$$

$$x = \text{items}$$

**(independent)**

$$y = \text{cost}$$

**(dependent)**

**To rent a DVD, a customer must pay \$1 for every day it is late.**

$$y = 1x$$

$x =$  days late  
(independent)

$$y = \text{cost}$$

(dependent)

**An air conditioning technician charges customers \$75 per hour.**

$x =$  hours  
(ind)

$$y = 75x$$

$y =$  cost  
(dep)

An employee receives 2 vacation days for every month worked.

$$\begin{aligned}x &= \text{months} \\y &= \text{vacation} \\y &= 2x\end{aligned}$$

A small size bottle of water costs \$1.99 and a large size costs \$3.49.

$$\begin{aligned}x &= \text{size} \\y &= \text{cost} \\y &= 1.99x + 349.6\end{aligned}$$