Today's Learning Goal(s):

By the end of the class, I will be able to:

a) Determine if a relation is a function (or not) given a mapping notation.
b) Determine if a relation is a function (or not) given a graph.

MCF 3MI

1.0 & 1.1 Characteristics of a Function

Date: Mar. 6/18
(Every lesson)

Review:

Ex.1: Identify which of the following are linear or quadratic:

a) $y = 5x + 2$ b) $y = 2x^2 - 3$ c) $y = -2$

linear quadratic linear

Ex.2: For each relation, determine the y-intercept and the axis of symmetry. (AofS)

a) $y = x^2 - 3$

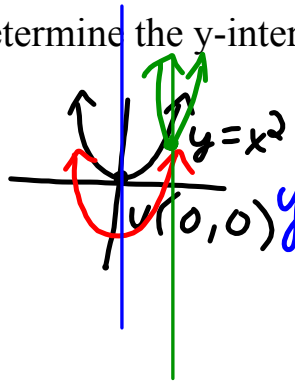
y-int, let x = 0

$y = (0)^2 - 3$

$= -3$

$V(0, -3)$

AofS: $x = 0$



b) $y = 3(x-2)^2 + 1$

y-int, let x = 0

$y = 3(0-2)^2 + 1$

$= 3(-2)^2 + 1$

$= 3(4) + 1$

$= 12 + 1$

$= 13$

$V(2, 1)$

AofS: $x = 2$

Domain and range describe all the possible values of the relation.

Domain describes ALL of the x-values.

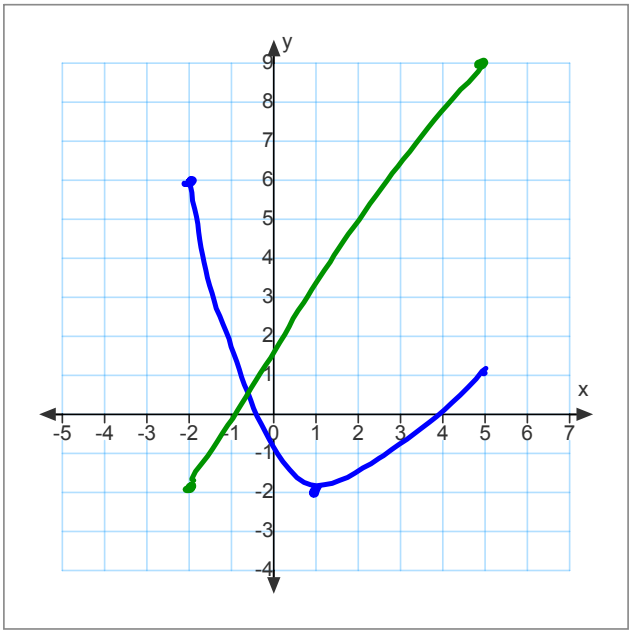
Range describes ALL of the y-values.

We use set notation to mathematically write the domain & range.

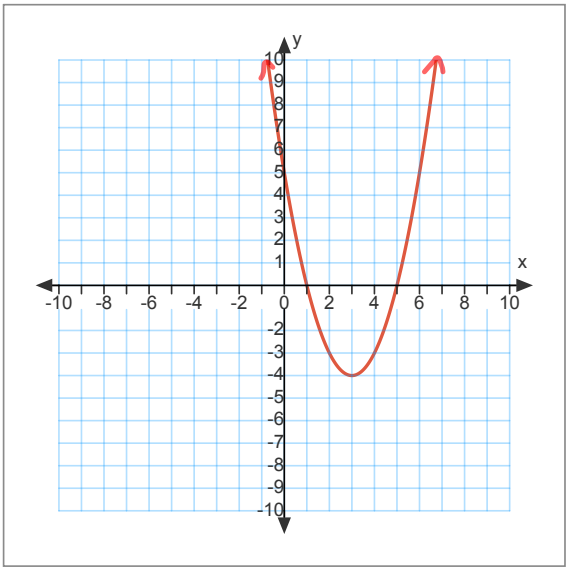
For example:

$$D = \{x \in \mathbb{R} \mid -2 \le x \le 5\}$$

$$R = \{y \in \mathbb{R} \mid y \ge -2\}$$



Ex.3: State the domain and range of the quadratic function below:



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

R: $\{y \in \mathbb{R} \mid y \ge -4\}$

A function is a relation that has a one-to-one relationship.
This means that for every x-value there is only one y-value.

Ex.4: For each of the following relations, determine the domain & range, then state whether or not it is a function.

a)

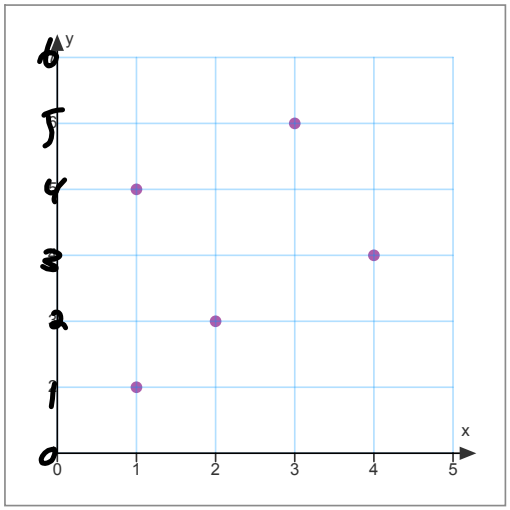
x	y
-1	-3
0	1
1	5
2	9

D: {-1, 0, 1, 2}

R: {-3, 1, 5, 9}

Function

b)



D: {1, 2, 3, 4}

R: {1, 2, 3, 4, 5}

NOT a function

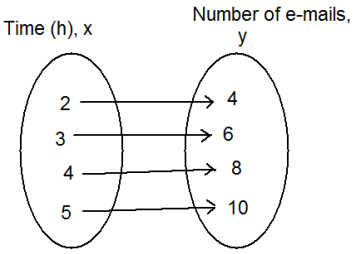
x Domain is smaller than Range.

c) G:(x, y) = {number of golfers, score below or above par}
= {(0, -2), (0, -1), (0, 0), (1, 5)}

D: {0, 1} not

R: {-2, -1, 0, 5}

d)

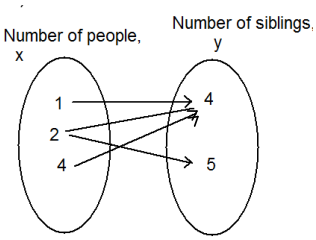


D: {2, 3, 4, 5}

R: {4, 6, 8, 10}

Function

e)



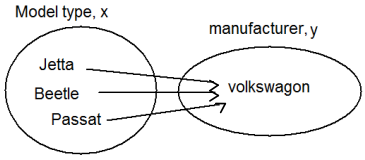
D: {1, 2, 4}

R: {4, 5}

Not ∴ a Repeats

(2 has more than 1 y value)

f)



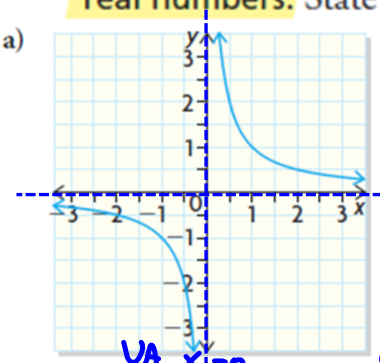
D: {J, B, P}

R: {VW}

Function

Ex.5: For each of the following relations, determine the domain and the range, using real numbers. State whether or not the relation is a function.

a)



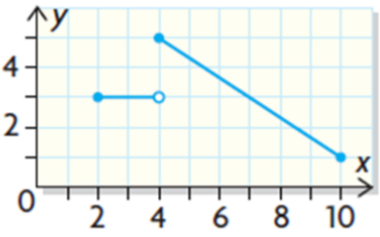
asymptote

D: $\{x \in \mathbb{R} \mid x \neq 0\}$

R: $\{y \in \mathbb{R} \mid y \neq 0\}$

Function

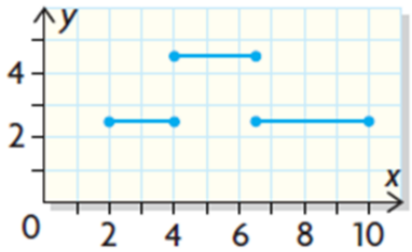
b)



D: $\{x \in \mathbb{R} \mid 2 \leq x \leq 10\}$

R: $\{y \in \mathbb{R} \mid 1 \leq y \leq 5\}$ Function

c)

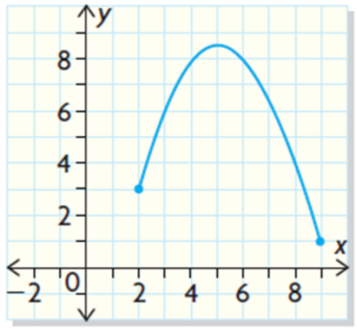


D: $\{x \in \mathbb{R} \mid 2 \leq x \leq 10\}$

R: $\{2.5, 4.5\}$

Not a function.

d)



Function

D: $\{x \in \mathbb{R} \mid 2 \leq x \leq 9\}$

R: $\{y \in \mathbb{R} \mid 1 \leq y \leq 8.5\}$

Ex. 6: Which variable would be associated with the domain for the following pairs of related quantities? Which variable would be associated with the range? Explain.

a) heating bill, outdoor temperature — Domain / Range

b) report card mark, time spent doing homework — Range

c) person, date of birth ? — Range

d) number of slices of pizza, number of cuts — Range

Range is the DEPENDENT variable

Practice: pp. 13-15 # 1- 4, 7, 8, 11