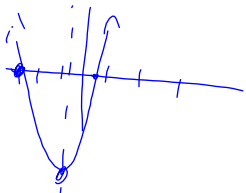
Are there any Homework Questions you would like to see on the board?

pp. 139-142 # 2bd, 3cd, 4bde, 5be, 6, 7cde, 12bcd, 14
READ pp.153-154

2. Express each quadratic function in factored form. Then determine the zeros, the equation of the axis of symmetry, and the coordinates of the vertex.

a) $f(x) = 2x^2 + 12x$
b) $f(x) = x^2 - 7x + 12$
c) $f(x) = -x^2 + 100$
d) $f(x) = 2x^2 + 5x - 3$



$0 = (2x-1)(x+3)$

$2x-1=0$ or $x+3=0$

$2x=1$ $x=-3$

$x=\frac{1}{2}$

Ans: $x=\frac{-3+\frac{1}{2}}{2}$

$=\frac{-\frac{6}{2}+\frac{1}{2}}{2}$

$=\frac{-\frac{5}{2}}{2} \rightarrow -\frac{5}{2} \div \frac{2}{1}$

$=-\frac{5}{2} \times \frac{1}{2}$

$=\frac{-5}{4}$ $=-\frac{5}{4}$

Ans: $x=\frac{-5}{4}$

$f\left(\frac{-5}{4}\right) = \left(2\left(\frac{-5}{4}\right)-1\right)\left(\left(\frac{-5}{4}\right)+3\right)$

$= \left(\frac{-5}{2}-\frac{2}{2}\right)\left(\frac{-5}{4}+\frac{12}{4}\right)$

$= \left(\frac{-7}{2}\right)\left(\frac{7}{4}\right)$

$= -\frac{49}{8}$

$\therefore V\left(\frac{-5}{4}, \frac{-49}{8}\right)$

or $(-1.25, -6.125)$

4. For each quadratic function, determine the zeros, the equation of the axis of symmetry, and the coordinates of the vertex without graphing.

a) $g(x) = 2x(x+6)$
b) $g(x) = (x-8)(x+4)$
c) $g(x) = (x-10)(2-x)$
d) $g(x) = (2x+5)(9-2x)$
e) $g(x) = (2x+3)(x-2)$
f) $g(x) = (5-x)(5+x)$

d) $0 = (2x+5)(9-2x)$

$2x+5=0$ or $9-2x=0$

$2x=-5$ $-2x=-9$

$x=\frac{-5}{2}$ $x=\frac{9}{2}$

Ans: $x=\frac{-\frac{5}{2}+\frac{9}{2}}{2}$

$=\frac{\frac{4}{2}}{2}$

$=\frac{2}{2}$

$x=1$

$g(1) = (2(1)+5)(9-2(1))$

$=(7)(7)$

$=49$

$\therefore (1, 49)$

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. 6/19
(Every lesson)

Review:

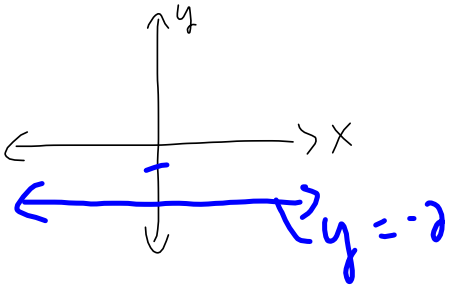
Ex.1: Identify which of the following are linear or quadratic:

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

Linear $y = mx+b$

quadratic

linear: horizontal line



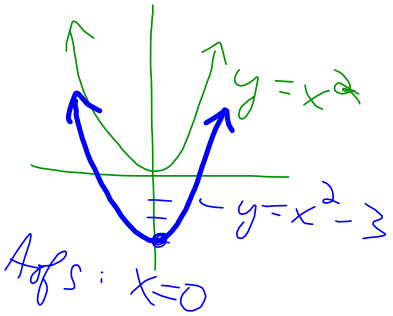
Ex.2: For each relation, determine the y-intercept and the axis of symmetry.

a) $y = x^2 - 3$

let $x=0$

$y = 0^2 - 3$

$y = -3$ ← y-int



AofS: $x=0$

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

let $x=0$

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

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

$= 3(4) + 1$

$y = 13$ ← y-int

$y = a(x-h)^2 + k$

$v(h,k)$

$v(2,1)$

AofS: $x=2$

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

Domain describes ALL of the x-values.

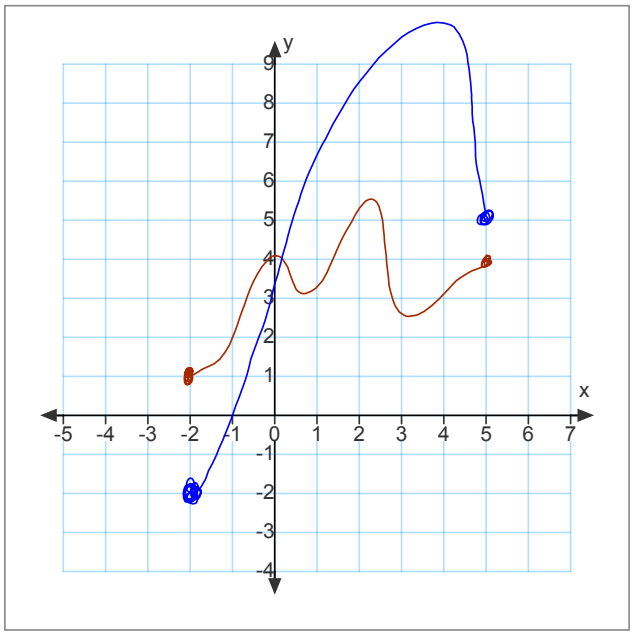
Range describes ALL of the y-values.

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

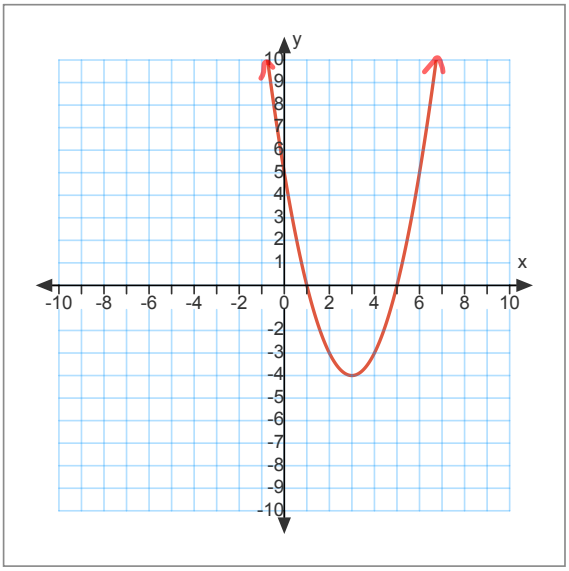
For example:

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

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



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)

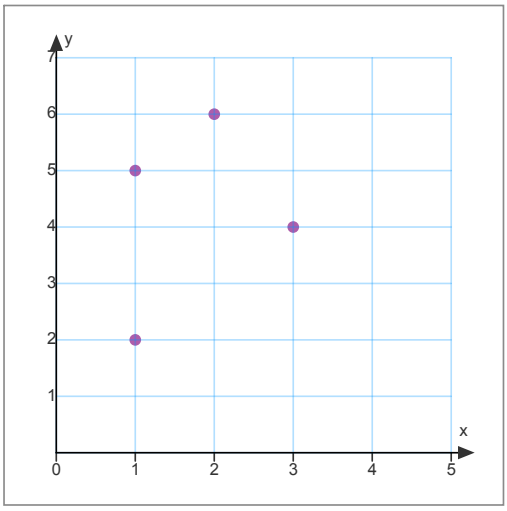
x	y
-1	-3
0	1
1	5
2	9

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

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

Function

b)



D: {1, 2, 3}

R: {2, 4, 5, 6}

Not a function
(x=1 repeats)

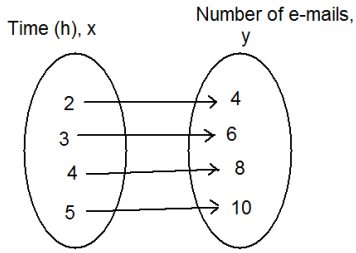
c) G:(x, y) = {number of golfers, score below or above par}
= {(0, -2), (0, -1), (0, 0), (1, 5)}

D: {0, 1}

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

Not a function

d)

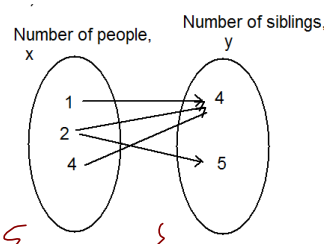


D: {2, 3, 4, 5}

R: {4, 6, 8, 10}

Function

e)

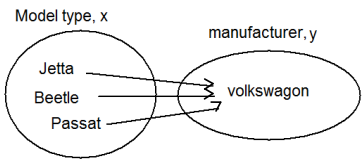


D: {1, 2, 4}

R: {4, 5}

NOT a function

f)

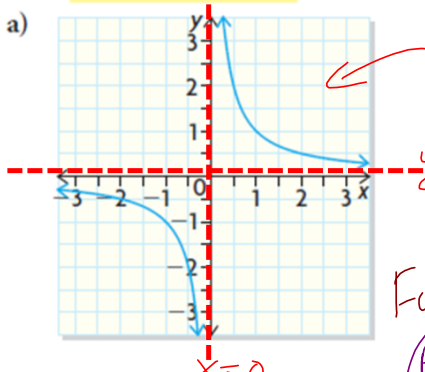


D: {Jetta, Beetle, Passat}

R: {Volkswagon}

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)

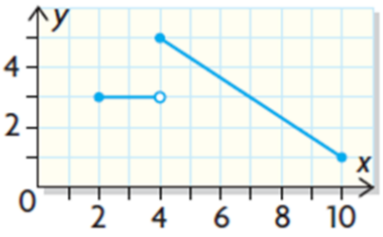


Function (Passes VLT)

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

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

b)

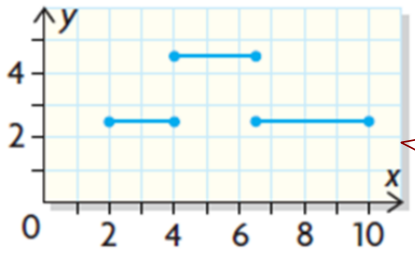


Function (Passes VLT)

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

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

c)

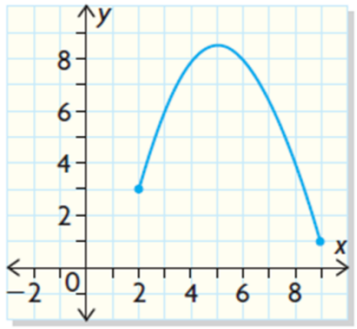


NOT a Function (FAILS VLT)

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

R: $\{2.5, 4.5\}$

d)

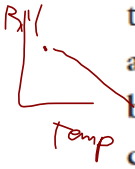


Function (Passes VLT)

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

b) report card mark, time spent doing homework

c) ~~person, date of birth~~

d) number of slices of pizza, number of cuts

Range is ALWAYS the DEPENDENT VARIABLE.

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