

## Domain and Range

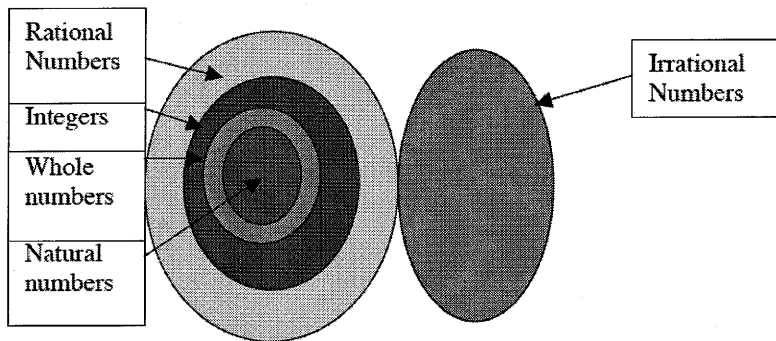
### Number Sets

In mathematics, the following sets (groups) of numbers are defined.

- Natural Numbers (N) = {1, 2, 3, 4, 5, ...}
- Whole Numbers (W) = {0, 1, 2, 3, 4, 5...}
- Integers (Z) = {..., -3, -2, -1, 0, 1, 2, 3, ...}
- Rational Numbers (Q) =  $\left\{ \frac{n}{m} \text{ such that } n \text{ and } m \text{ are integers and } m \neq 0 \right\}$
- Irrational Number (I) = {numbers that aren't rational such as  $\pi$  and  $\sqrt{2}$ }
- Real Numbers ( $\mathbb{R}$ ) = {N, W, Z, Q, I}

$\frac{2}{3}, 1.25 = \frac{5}{4}, 8 = \frac{8}{1}$

These sets can be displayed in the following Venn Diagram:



### Inequality Symbols

Recall from previous teachings that the crocodile (<) always eats the larger quantity.

Symbol	Definition
>	greater than
≥	greater than or equal to
<	less than
≤	less than or equal to
=	equal to
≠	not equal to

Ex  
 →  $x > y$   
 x is greater than y  
 →  $x < y$   
 x is less than y



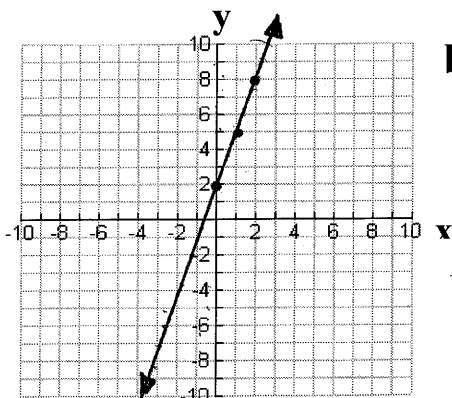
### Example 2

Graph each equation below then determine the domain and range.

a)  $y = 3x + 2$

$m = \frac{3}{1}$

$b = 2$



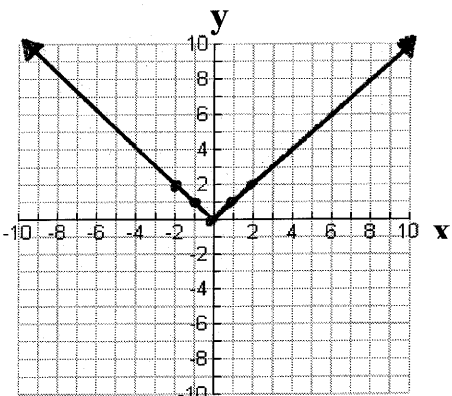
$D: \{x \in \mathbb{R}\}$

$R: \{y \in \mathbb{R}\}$

absolute value

c)  $y = |x|$

x	y
-2	2
-1	1
0	0
1	1
2	2



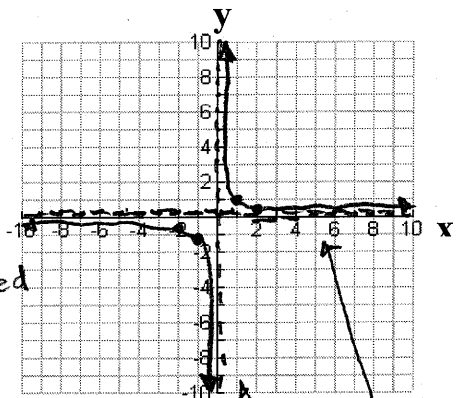
$D: \{x \in \mathbb{R}\}$

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

Reciprocal Function

e)  $y = \frac{1}{x}$

x	y
-2	-1/2
-1	-1
0	Undefined
1	1
2	1/2



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

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

vertical asymptote

Horizontal Asymptote

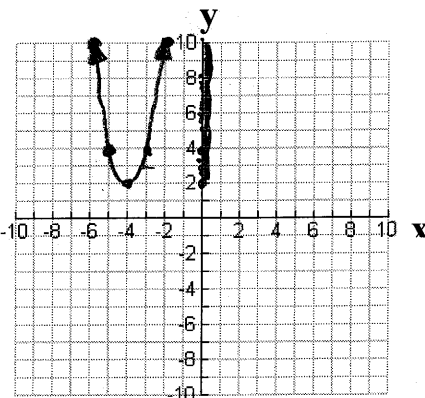
b)  $y = 2(x+4)^2 + 2$

vertex  $\rightarrow (-4, 2)$

step pattern:

2, 6, 10

$(1, 3, 5) \times 2$

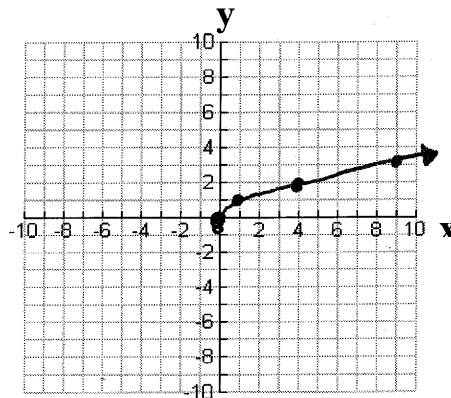


$D: \{x \in \mathbb{R}\}$

$R: \{y \in \mathbb{R} \mid y \geq 2\}$

d)  $y = \sqrt{x}$

x	y
0	0
1	1
4	2
9	3

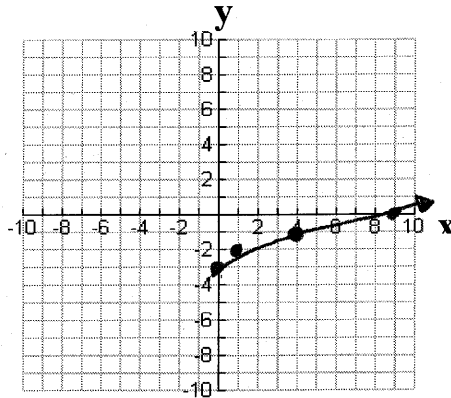


$D: \{x \in \mathbb{R} \mid x \geq 0\}$

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

f)  $y = \sqrt{x} - 3$

x	y
0	-3
1	-2
4	-1
9	0



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

$R: \{y \in \mathbb{R} \mid y \geq -3\}$