

Focus:

1. To be able to understand the meaning of domain and range.
2. To be able to express domain and range in a variety of ways.

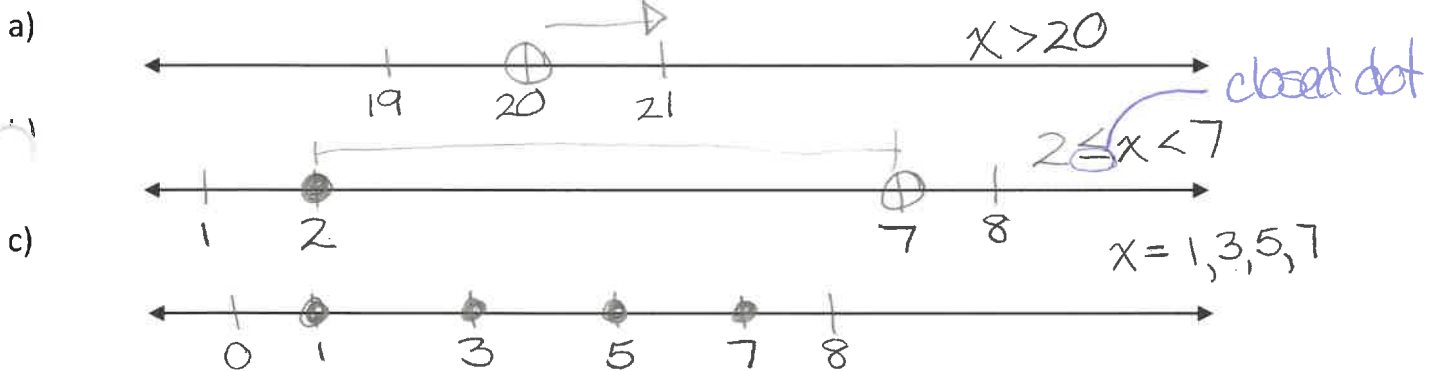
Definitions:

Domain: all possible x values (independent variable)

Range: all possible y values (dependent variables)

There are 5 ways to express domain and range of a relation ...

Number Line: visual of permitted values



Words: written permitted values

a) all values greater than 20

b) all values including and greater than 2 and less than 7.

c) the values are 1, 3, 5, 7

Set Notation: formal math notation

Symbols ... { } set | such that  $\in$  element of

a)  $\{x | x > 20, x \in \mathbb{R}\}$   $\star \mathbb{R} = \text{real numbers}$   $x > 20$

b)  $\{x | 2 \leq x < 7, x \in \mathbb{R}\}$   $2 \leq x < 7$

c)  $\{x | x = 1, 3, 5, 7, x \in \mathbb{R}\}$   $x = 1, 3, 5, 7$

Interval Notation: uses brackets to show range of possible values

Symbols ... [ ] if end # is included ( ) end # is not included  $\infty$  there isn't an endpoint

$\mathbb{R}$  real # | integers | w whole #  
 $\star$  write in order, least to greatest

a)  $(20, \infty)$   $x > 20$

b)  $[2, 7)$   $2 \leq x < 7$

c)  $\star$  cannot use with discrete data  $x = 1, 3, 5, 7$

List: good for discrete data

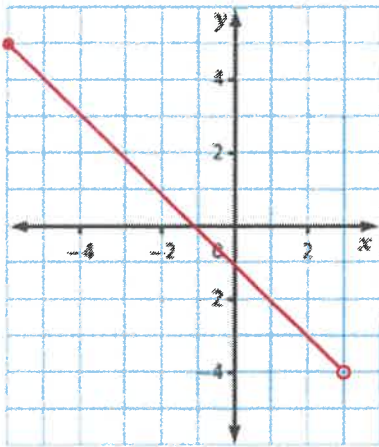
eg  $(9, 4), (8, 3), (7, 2), (6, 1)$

domain  $\{9, 8, 7, 6\}$  range  $\{4, 3, 2, 1\}$

Determine domain and range from a graph.

For each graph, give the domain and range. Use words, a number line, interval notation, and set notation.

a)



domain  
all values including -6 through to, but not including 3



$$[-6, 3)$$

$$\{x \mid -6 \leq x < 3, x \in \mathbb{R}\}$$

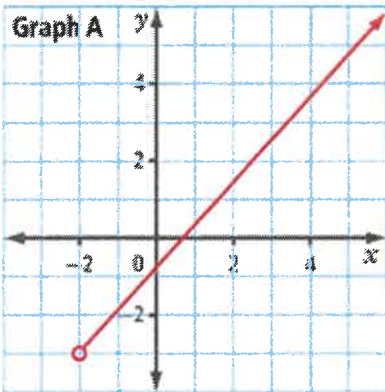
range  
all values greater than -4 and less than or equal to 5



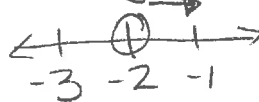
$$(-4, 5]$$

$$\{y \mid -4 < y \leq 5, y \in \mathbb{R}\}$$

b)



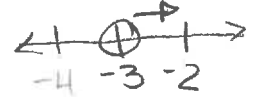
all values greater than -2



$$(-2, \infty)$$

$$\{x \mid x > -2, x \in \mathbb{R}\}$$

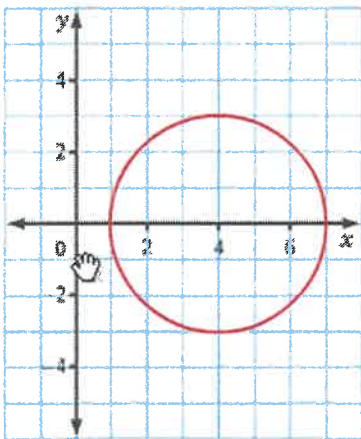
all values greater than -3



$$(-3, \infty)$$

$$\{y \mid y > -3, y \in \mathbb{R}\}$$

c)



all values greater than or equal to 1 and less than or equal to 7



$$[1, 7]$$

$$\{x \mid 1 \leq x \leq 7, x \in \mathbb{R}\}$$

all values greater than or equal to -3 and less than or equal to 3



$$[-3, 3]$$

$$\{y \mid -3 \leq y \leq 3, y \in \mathbb{R}\}$$