

4.3 Domain and Range

****Big, Important Idea****

The **domain** of a relation is the set of all possible values which can be used for the **input** of the **independent variable (x)**.

The **range** of a relation is the set of all possible values of the **output** of the **dependent variable (y)**.

Discrete Data

Rule:
 Domain: {all x-values}
 Range: {all y-values}

Continuous Data

Rule:
 Domain: $\{x | a \leq x \leq b, x \in \mathbb{R}\}$
 Range: $\{y | c \leq y \leq d, y \in \mathbb{R}\}$

*put the smallest value first and the biggest value second



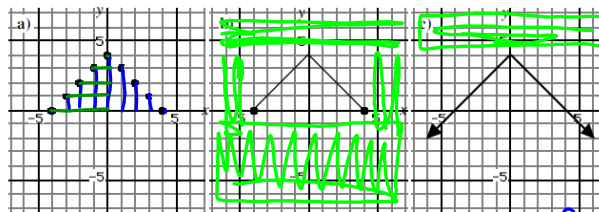
List the domain and range of the following set of ordered pairs.

- a) (1,2), (0,5), (3,8), (5,9), (-3,2) b) (3,3), (0,3), (-3,3), (2,9), (-8,3)

D: $\{-3, 0, 1, 3, 5\}$ D: $\{-8, -3, 0, 2, 3\}$
 R: $\{2, 5, 8, 9\}$ R: $\{3, 9\}$



In each case, state the domain and range of the relation represented by the graph.



D: $\{4, -3, -2, \dots, 2, 3, 4\}$ D: $\{x | -4 \leq x \leq 4, x \in \mathbb{R}\}$ D: $\{x \in \mathbb{R}\}$
 R: $\{0, 1, 2, 3, 4\}$ R: $\{y | 0 \leq y \leq 4, y \in \mathbb{R}\}$

R: $\{y | y \leq 4, y \in \mathbb{R}\}$
 R: $\{y | y \leq 4, y \in \mathbb{R}\}$

Functions

Ex.) State the domain and range for each relation:

a)

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

b)

D: $\{x \mid -2 \leq x \leq 4, x \in \mathbb{R}\}$
 R: $\{y \mid -3 \leq y \leq 1, y \in \mathbb{R}\}$

c)

D: $\{1, 2, 3\}$
 R: $\{2, 6\}$

d) A circle with center $(-2, 3)$ and a radius of 3.

D: $\{x \mid -5 \leq x \leq 1, x \in \mathbb{R}\}$
 R: $\{y \mid 0 \leq y \leq 6, y \in \mathbb{R}\}$

Functions

Ex.) Draw the graph of a relation which has a domain of $x \in \mathbb{R}$, range $\{y \mid y \leq 2, y \in \mathbb{R}\}$ and:

i) only one x-intercept

roof

ii) two x-intercepts

arrows

b) Can you draw a graph which has domain of $x \in \mathbb{R}$, range $\{y \mid y \leq 2, y \in \mathbb{R}\}$ and no x-intercepts?