

Section 3.6: Relations and Functions

Objectives:

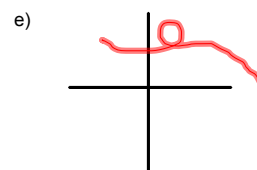
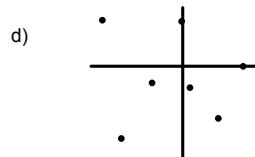
- ✦ Identify the domain and range of a relation.
- ✦ Determine if a relation is a function by inspection.
- ✦ Use function notation and evaluate functions.
- ✦ Identify the domain and range of a function.

A relation is a set of ordered pairs:

a) $\{ (2,3), (1,5), (8,4), (5,3) \}$

b) The set of first names paired with last names in a large class

c) $\{ (s,N) \mid s = \text{social security number}, N = \text{name} \}$

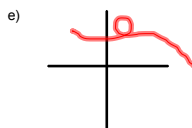
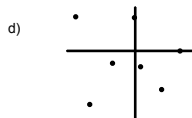


Domain

Range

A function, f from set A to set B, is a rule of correspondence that assigns to each element of the domain, x , exactly one element, y , in set B.

- a) $\{(2,3), (1,5), (8,4), (5,3)\}$
- b) The set of first names paired with last names in a large class
- c) $\{(s,N) | s = \text{social security number}, N = \text{name}\}$



① EXAMPLE:

Do these relationships describe a function?

- a) Input: student in this class
Output: final grade in the class
- b) Input: State
Output: number of senators from that state.
- c) Input: Adults who drive cars
Output: Cars they drive
- d) Input: Friend's name
Output: Friend's phone number

Vocabulary:

$f(x)$

Independent variable

Dependent variable

$f(a)$ means

$f(2)$ means

② EXAMPLE:

Evaluate this function at the given x-values:

$$f(x) = \frac{x^2 - 6}{x + 1}$$

a) $f(2) =$

b) $f(-3) =$

c) $f(\star) =$

d) $f(2) - f(1)$

e) $f(t-1) =$

③ EXAMPLE:

Evaluate this piece-wise function for the given values.

$$f(x) = \begin{cases} x^2 - 1 & \text{if } x \leq 1 \\ 2x + 1 & \text{if } x > 1 \end{cases}$$

a) $f(1) =$

b) $f(-2) =$

c) $f(3) =$

④ EXAMPLE:

$$f(x) = 3x - 7$$

find $f(x+h) - f(x)$

⑤ EXAMPLE: For each of these functions write the domain.

a) $r(x) = \{ (2,1), (3,2), (1,5), (4,1) \}$

b) $f(x) = \sqrt{x+1}$

c) $g(x) = \frac{2x-1}{3x+2}$

d) $k(x) = x^2-3x+2$

e) $g(x) = \frac{1}{(2x+1)(x-2)}$