

# 1.1 Relations & Functions

## 1.4 Domain & Range

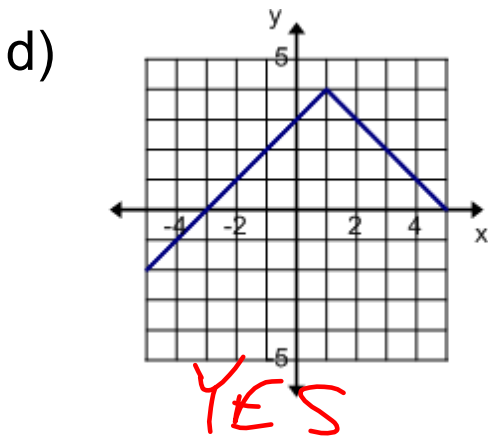
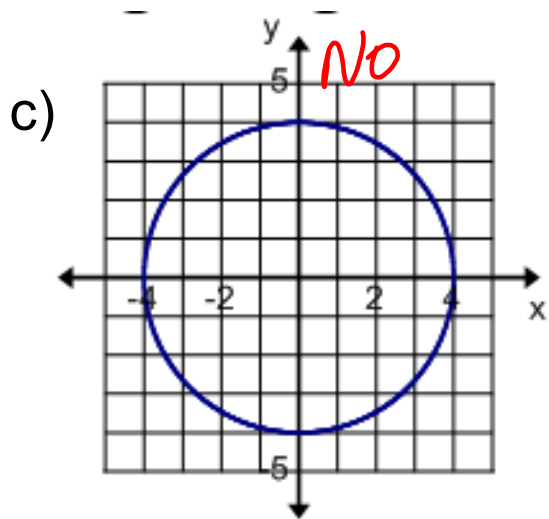
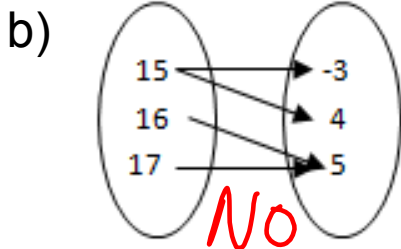
Relation: A set of ordered pairs

Function: A one-to-one relation. ie. each x-value has only one corresponding y-value

Eg. Determine if the following relations are functions.

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

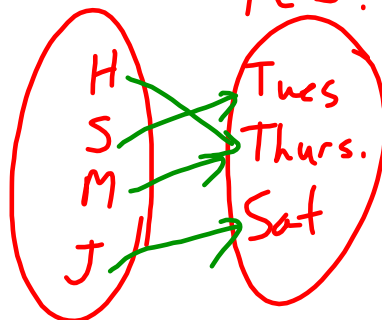
NO



e)

STUDENT NAME	HOCKEY PRACTICE NIGHT
Heather	Thursday
Scott	Tuesday
Maiwand	Thursday
Jet	Saturday

Yes.



### Identifying Functions by equations

1. A linear equation is always a function unless it is a vertical line.  
 $y = mx + b$        $Ax + By = C$

2. A Quadratic is a function in the form of  
 $y = Ax^2 + Bx + C$        $y = A(x - h)^2 + k$

3. A circle is NOT a function

$$r^2 = x^2 + y^2$$

### Examples:

Circle which relations below are functions.

$$y = x^2 - 4$$

$$y = (x + 3)^2$$

$$y = 3$$

$$3x + 4y = 1$$

$$x = 3 \quad \times$$

$$y = 3x^2 - 4x - 1$$

$$y = 3x - 4$$

$$x^2 + y^2 = 16$$

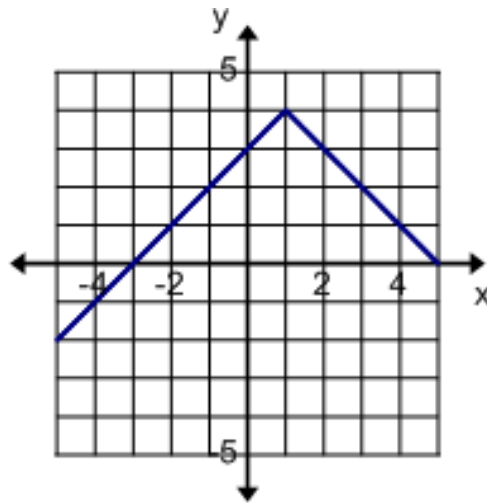
$$y = 3(x - 4)^2 - 3$$

$$(x - 2)^2 + (x + 3)^2 = 25$$

Describe the following graph's location on the axes in words.

$$-5 \leq x \leq 5$$

$$-2 \leq y \leq 4$$



We can describe relations mathematically using Domain & Range.

Domain: The set of x-values that form a relation

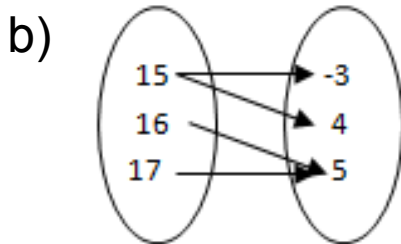
Range: The set of y-values that form a relation

Eg. 2) State the Domain & Range for the following relations.

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

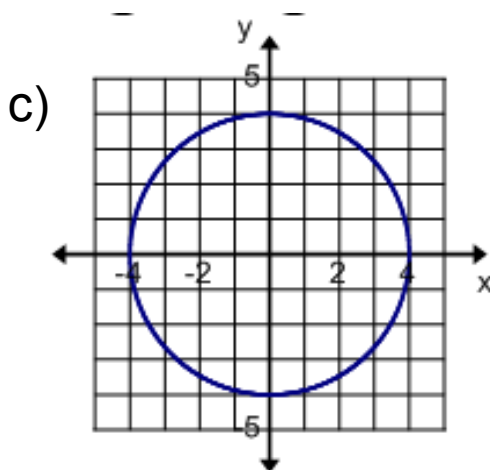
$$D = \{3, 4, 1, -1\} \quad D = \{-1, 1, 3, 4\}$$

$$R = \{2, -1, 1, 5\} \quad R = \{-1, 1, 2, 5\}$$



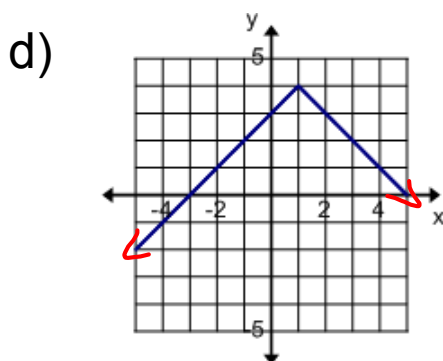
$$D = \{15, 16, 17\}$$

$$R = \{-3, 4, 5\}$$



$$D = \{x \in \mathbb{R} \mid -4 \leq x \leq 4\}$$

$$R = \{y \in \mathbb{R} \mid -4 \leq y \leq 4\}$$



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

$$R = \{y \in \mathbb{R} \mid -2 \leq y \leq 4\}$$

e) The graph above with arrows

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

$$R = \{y \in \mathbb{R} \mid y \leq 4\}$$

p. 10 #1-3, 6, 7a, 8, 9b  
\* [p. 13 #1-3]  
p. 35 #1-3, 5