

Mini-Lecture 2.1

Relations

Learning Objectives:

1. Understand relations.
2. Find the domain and the range of a relation.
3. Graph a relation defined by an equation.

Preparing for Relations:

- i) Write the inequality $-3 \leq x < -1$ in interval notation.

DEFINITION

When the elements in one set are linked to elements in a second set, we have a **relation**. If x and y are two elements in these sets and if a relation exists between x and y , then we say that x **corresponds** to y or that y **depends on** x , and we write $x \rightarrow y$. We may also write a relation where y depends on x as an ordered pair (x, y) .

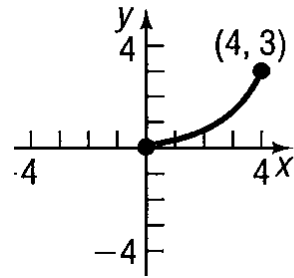
DEFINITION

The **domain** of a relation is the set of all inputs of the relation. The **range** is the set of all outputs of the relation.

Examples:

1. Write each relation as a map. Then identify the domain and the range of the relation.
 - a) $\{(-1, 2), (-1, 3), (1, 2), (1, -2)\}$
 - b) $\{(0, 1), (0, 3), (0, 5)\}$

2. Identify the domain and the range from the graph. Write your answer in set builder notation and in interval notation.



3. Use the graphs obtained in mini-lecture 1.5 to identify the domain and the range of the relation.

a) $y = -2x$

b) $y = \frac{3}{4}x - 2$

c) $x - 3y = -6$

d) $y = -x^2 + 2$

e) $y = |x - 3|$