

Unit 2 - Functions

Functions, Domain, and Range

A relation is any set of ordered pairs (x, y) relating an independent variable (typically x) to a dependent variable (typically y).

For example: $\{(0,1), (3,4), (2,-5)\}$ is a set of ordered pairs.

Reminders:

- $\{ \}$ enclose elements of a set
- ,
- R means real numbers
- I means integers
- \in means "an element of"

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Domain is the set of all possible values for the independent variable.

Range is the set of all possible values for the dependent variable.

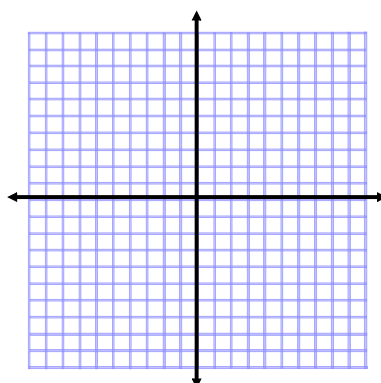
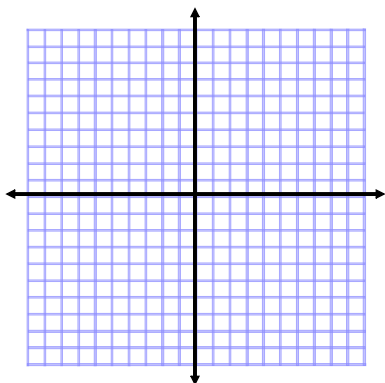
Ex.1 State the domain and range for
 $\{(0, 1), (3, 4), (2, -5)\}$

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Ex.2 State the domain and range for each graph:

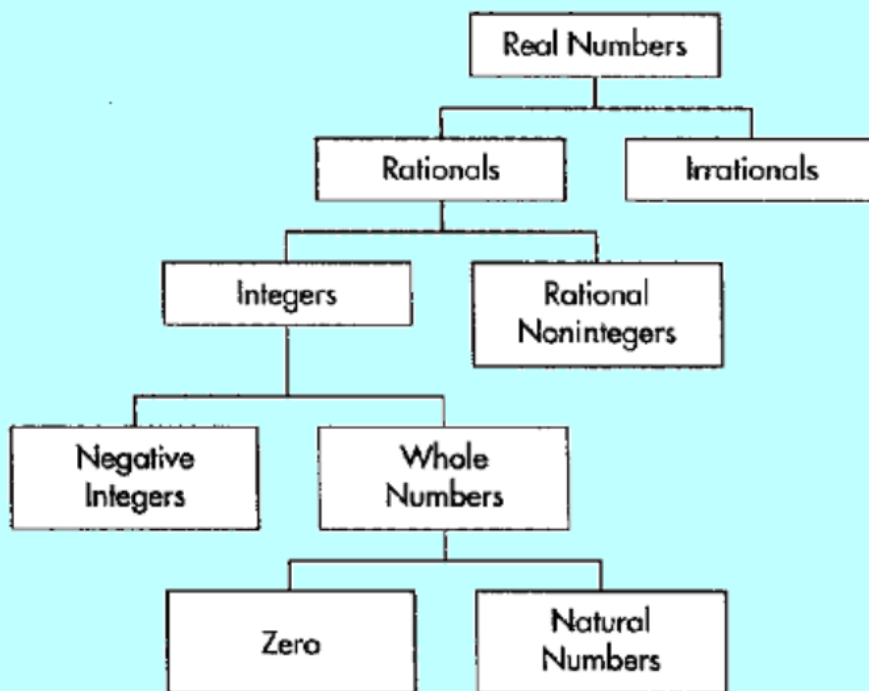
(a) $y = x$

(b) $y = x^2$



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Sets of Numbers:



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A function is a special type of relation where each value x yields only a single value of y .

Many mathematical techniques can only be applied to functions, so it is important to be able to determine if a relation is a function.

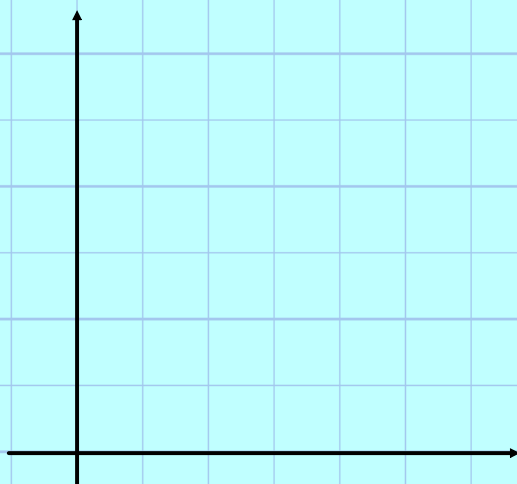
Ex.3 State the domain and range, and determine which are functions.

(a) $\{ (1,2), (3,1), (4,2), (7,2) \}$

(b) $\{ (1,2), (1,3), (4,5), (6,1) \}$

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Consider $\{ (1,2), (1,3), (4,5), (6,1) \}$



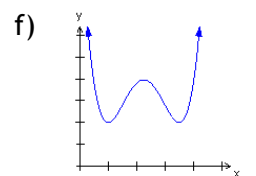
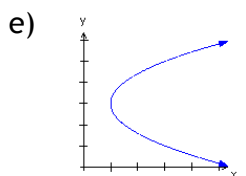
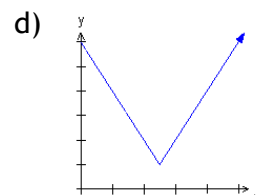
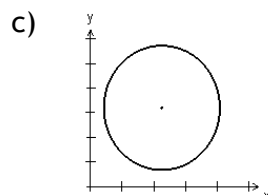
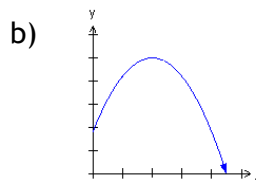
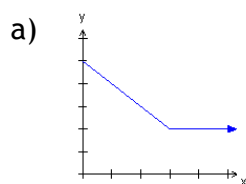
This relation is not a function, since the independent value of 1 has two possible dependent values, 2 and 3

Graphically, this relation fails the vertical line test. If a vertical line can be drawn through more than one point on the graph of the relation, then it is not a function.

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If any vertical line passes through more than one point on the graph of a relation, it is not a function. This is known as the vertical line test.

Ex.4 Which graphs are functions?



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The equation of a relation which is a function can be written using a special notation, **function notation**.

x-y notation

$$y = 3x + 2$$

function notation

$$f(x) = 3x + 2$$

Ex.5 If $f(x) = 3x + 2$, evaluate:

a) $f(5)$

b) $f(-1)$

c) $f(2/3)$

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Assigned Work:

p.178 # 1 - 3, 5, (6-10)ad, 15, 18

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