BRAVO Me

goals

مقرر الرياضيات
MATH-110

Section 1.1

Four ways to represent a function

Concept + Examples + Exercises

ابدأ التعلم الآن

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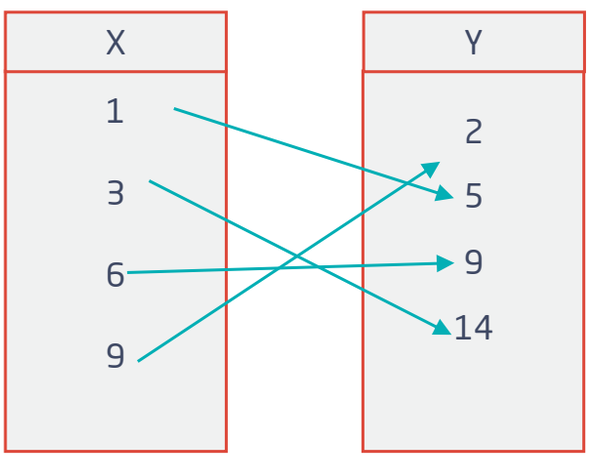
Functions

(الدوال)

Definition of functions

- We say that $f: X \rightarrow Y$ is a function if every element in the set X takes exactly one image in Y
- The set X is called the Domain (D_f)
- The set Y is called the Range (R_f)

Example



- A function

Each X has exactly one image in Y

$f(1) = 5$

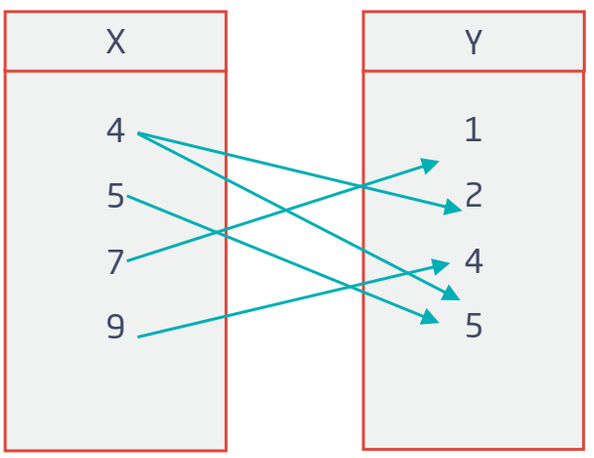
$f(3) = 14$

$f(6) = 9$

$f(9) = 2$

$D_f = \{1, 3, 6, 9\}$

$R_f = \{2, 5, 9, 14\}$



- Not a function

The number (4) has two images in Y

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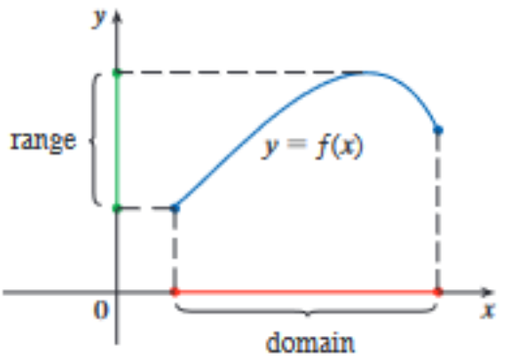
Functions (continue)

(الدوال)

Graphs

- The domain is all points in x axis
- The range is all points on y axis

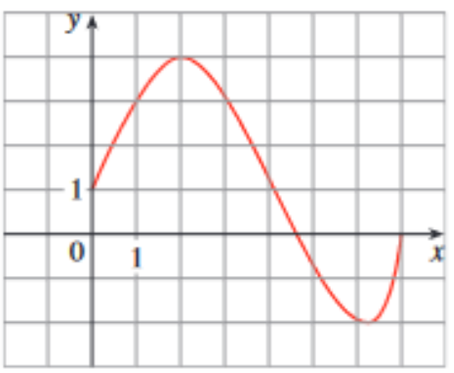


Exercise

EXAMPLE 1 The graph of a function f is shown in Figure

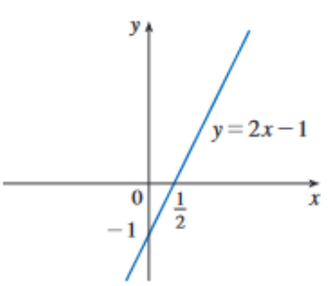
(a) Find the values of f (1) and f (5)

(b) What are the domain and range of f ?

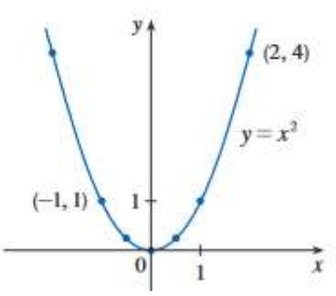


EXAMPLE 2 find the domain and range of each function

(a) $f(x) = 2x - 1$



(b) $g(x) = x^2$



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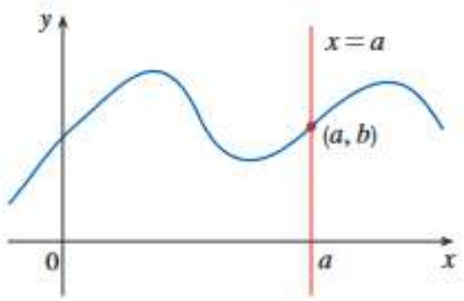
The vertical line test

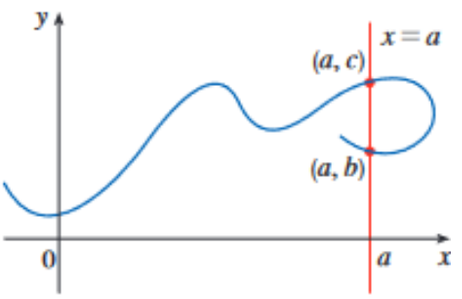
(اختبار الخط الرأسي)

The vertical line test

- $f(x)$ is a function if and only if no vertical line intersects the curve more than once.



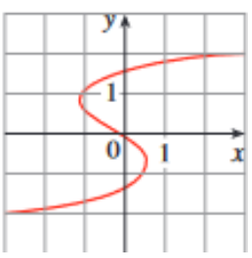
A function

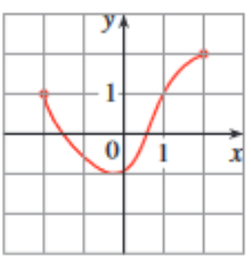


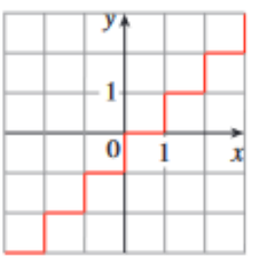
Not a function

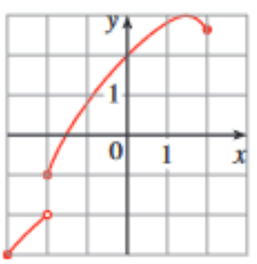
Exercise

Determine whether the curve is a function or not, if it is, state the domain and the range









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Piecewise Defined Functions: Absolute Value

(الدوال متعددة التعريف:
القيمة المطلقة)

- $f(x) = |x|$, defined by different formulas in different parts of their domains.

Example 7

A function f is defined by

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

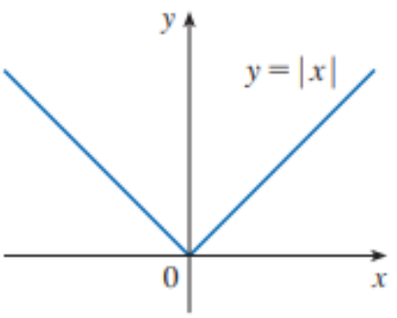
Evaluate $f(-2)$, $f(-1)$, and $f(0)$ and sketch the graph.

Piecewise Defined Functions: Absolute Value

(الدوال متعددة التعريف:
القيمة المطلقة)

Absolute value

- $f(x) = |x| = \begin{cases} x & \text{if } x \geqslant 0 \\ -x & \text{if } x < 0 \end{cases}$



- $Domain = R \ \ (always)$
- $Range\ f(x) \geq 0$

Example 8

Sketch the graph of the absolute value function $f(x) = |x|$.

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Piecewise Defined Functions: Absolute Value

(الدوال متعددة التعريف:
القيمة المطلقة)

Example Find the domain and Range

- $f(x) = \frac{|x|}{x}$

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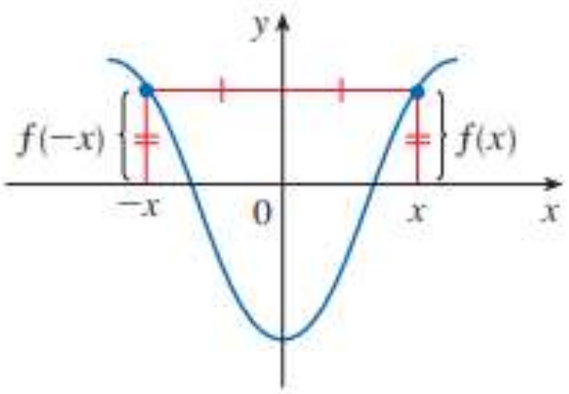
Even and Odd Functions

(الدوال الزوجية والفردية)

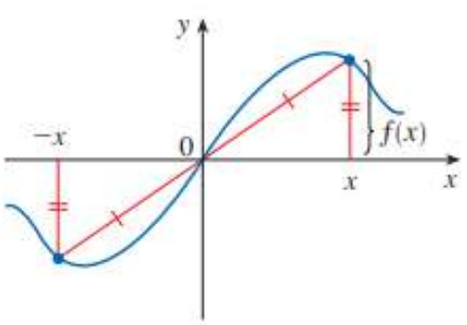
Even functions

- $f(x)$is an even function if $f(-x) = f(x)$
- Symmetric about y-axis
- Example: $f(x) = x^2$ is even because $f(-x) = (-x)^2$
  $= x^2$
  $= f(x)$



Odd functions

- $f(x)$is an odd function if $f(-x) = -f(x)$
- Symmetric about origin (0,0)
- Example: $f(x) = x^3$ is odd because $f(x) = (-x^3)$
  $= -x^3$
  $= -f(x)$



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Even and Odd Functions (Continues)

(الدوال الزوجية والفردية)

Notes:

Any constant number = even

- Odd $\pm$ Odd = Odd
- Even $\pm$ Even = Even
- Odd $\pm$ Even = Neither

- Even X Even = Even
- Odd X Odd = Even
- Odd X Even = Odd
- Odd or Even X Neither = Neither
- Neither X Neither = Neither

- $\frac{odd}{odd} = \frac{even}{even} = even$
- $\frac{odd}{even} = \frac{even}{odd} = odd$
- $\frac{even}{neither} = \frac{odd}{neither} = \frac{neither}{neither} = neither$

Exercise

EXAMPLE 11 Determine whether each of the following functions is even, odd, or neither even nor odd

(a) $f(x) = x^5 + x$ (b) $g(x) = 1 - x^4$ (c) $h(x) = 2x - x^2$

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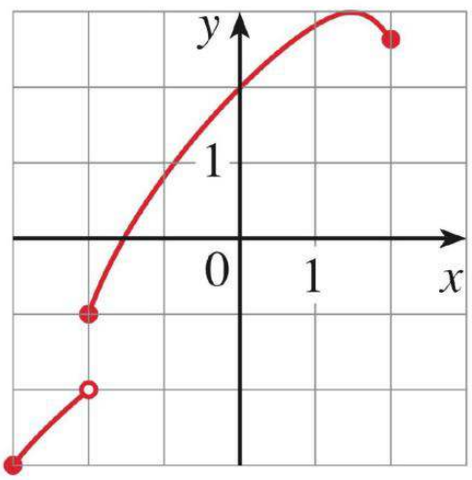
Exercises

Exercise 17

Determine whether the curve is the graph of a function of x. If it is, state the domain and range of the function.



تأكد دائمًا ان
#الدافور_معاك!

The End

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