Worksheet

Real functions

• Not each relation from X to Y is a function but all functions from X to Y are relations satisfy that:

- Each element in X appears once as a first projection in one of the ordered pairs of the relation.

Each element in X has only one arrow going out to an element of Y in the arrow diagram which represents the relation.

1. The relation $y = 4$ (represented by a horizontal straight line parallel to X-axis) is a function from X to Y because each element in X is related with only one element in Y

2. The relation $X = 4$ (represented by a vertical straight line parallel to y-axis is not a function from X to Y because the element $X = 4$ is related with infinite number of elements in Y

* The unshaded circle at point $(-2, -1)$ shows that the point $\notin$ the function and so $-2 \notin$ the domain of the function and $-1 \notin$ the range of the function.
* The shaded circle at point $(2, 3)$ shows that the point $\in$ the function and so $2 \in$ the domain of the function and $3 \in$ the range of the function.

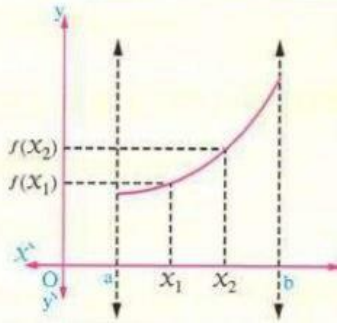
The function

f is said to be increasing on

an interval $]a , b[$ if :

$x_2 > x_1 \Rightarrow f(x_2) > f(x_1)$ for every

$x_1 , x_2 \in]a , b[$



Definition (2) ***(Decreasing function) :***

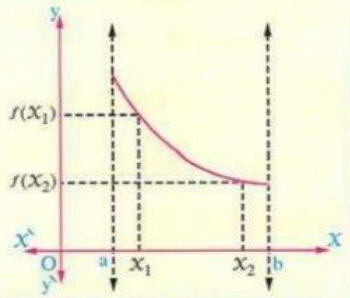
The function

f is said to be decreasing on

an interval $]a , b[$ if :

$x_2 > x_1 \Rightarrow f(x_2) < f(x_1)$ for every

$x_1 , x_2 \in]a , b[$



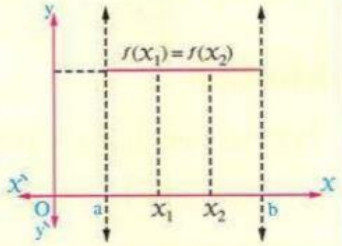
Definition (3) ***(Constant function) :***

The function

f is said to be constant on an interval $]a , b[$ if :

$x_2 > x_1 \Rightarrow f(x_2) = f(x_1)$ for every

$x_1 , x_2 \in]a , b[$

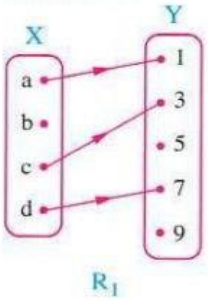


If $f : \mathbb{R}^+ \longrightarrow \mathbb{R}$ where $f(x) = 2x^2 - 7x + 5$

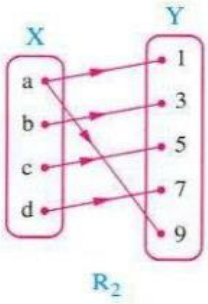
and $g :]-\infty , 4] \longrightarrow \mathbb{R}$ where $g(x) = 2x - 5$

Find : (1) $(f + g)(x)$ (2) $(f - g)(x)$

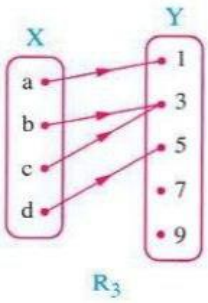
Show with reasons ، which of the following relations (represented by the shown arrow diagrams) represents a function ، if so ، mention each of the domain and the range for every function :



R_1



R_2



R_3

State the domain of each of the rational functions defined by the following rules

$$f(x) = \sqrt{x+2}$$

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