Question
Real functions

Determine the domain and range for each function represented by the following figures :

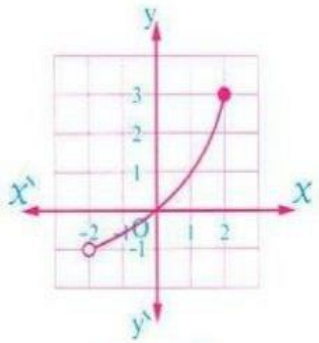


Fig. (1)

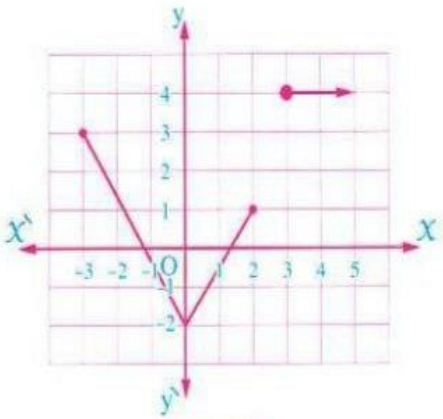
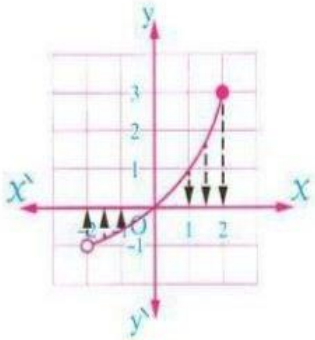


Fig. (2)

Solution

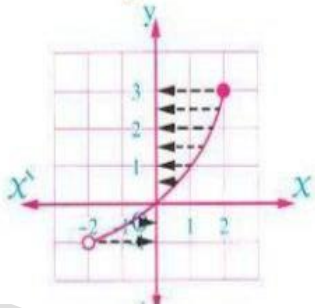
In fig. (1) : * The X-coordinates of all points on the curve of the function are on the interval $]-2, 2]$

$\therefore$ The domain = $]-2, 2]$



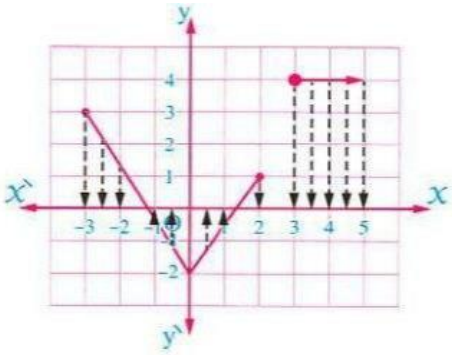
* The y-coordinates of all points on the curve of the function are on the interval $]-1, 3]$

$\therefore$ The range = $]-1, 3]$



In fig. (2) : * The X-coordinates of all points on the curve of the function are on the two intervals $[-3, 2]$ and $[3, \infty[$

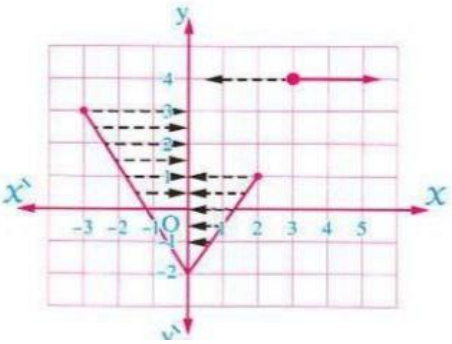
$\therefore$ The domain = $[-3, 2] \cup [3, \infty[$



* The y-coordinates of the points at the horizontal ray is $y = 4$

, the y-coordinates of the other points of the curve are on the interval $[-2, 3]$

$\therefore$ The range = $[-2, 3] \cup \{4\}$



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

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

$$f(x) = \sqrt[3]{9 - x^2}$$

Determine the domain of each of the two functions defined by the following rules:

$$f(x) = \begin{cases} 2 - x & , \quad x < 0 \\ x - 2 & , \quad x > 0 \end{cases}$$

$$f(x) = \begin{cases} x^2 & , \quad -2 \le x < 0 \\ x & , \quad 0 \le x \le 1 \\ \frac{1}{x} & , \quad x > 1 \end{cases}$$