



Answer all questions

1. Draw the graph of the following functions and also find their domain and range. [10]

(i)  $y = \sqrt{\frac{x^2-9}{x+3}}$

(ii)  $y = 4 + \sqrt{2-x}$

(iii)  $y = \frac{x}{x-1}$

(iv)  $y = 3 - |2x - 1|$

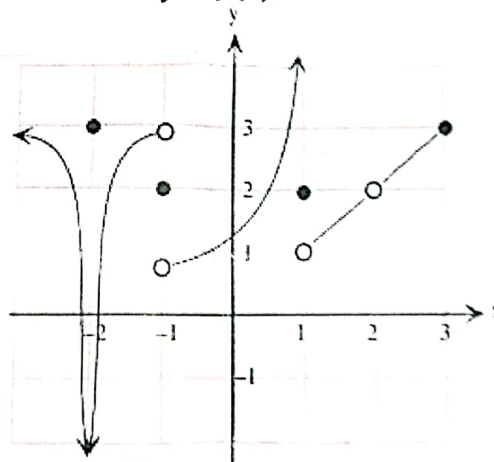
2. Determine whether the following functions are one to one or many to one. Find the inverse of each function (if possible) and plot them in the same graph: [6]

(i)  $f(x) = 1 - (x - 1)^2$

(ii)  $f(x) = \sqrt[3]{x-2} + 2$

3. (a) Show that  $y = -3 + |x - 1|$  is continuous at  $x = 1$ . [2]

- (b) Given the graph of the function  $y = f(x)$ . [6]



From the figure write the answers of the following questions:

- (i)  $\lim_{x \rightarrow -2} f(x)$   
(ii)  $\lim_{x \rightarrow 1} f(x)$   
(iii)  $\lim_{x \rightarrow 2} f(x)$   
(iv) Is the function continuous at  $x = -1$  and  $x = 2$ ? Explain your answer.  
(v) Find  $f(-2)$  and  $f(2)$ .
3. Consider a function  $f(x) = -\frac{1}{x}$  for the following: [6]
- (i) Use the definition to find the slope at  $x = x_0$  of the given function.  
(ii) Find the equation of tangent line to the graph of function at  $x = 1$ .  
(iii) Sketch the graph of  $f(x)$  along with the tangent line found above.