



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

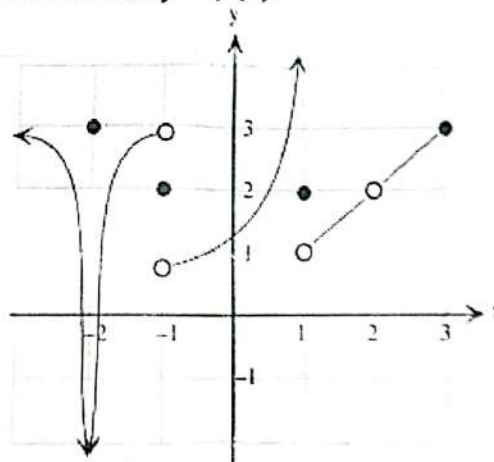
2. Determine whether the following functions are one to one or many to one. Find the inverse of each function (if possible) and plot them in the same graph: [6]

(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.