1 No Ans

①

$$f(x) = \frac{x^2 - 169}{x - 13}$$

for Domain: $f(x)$ is not defiend for

$x - 13 = 0$

$\Rightarrow x = 13$

$\therefore D_f = R - \{13\}$

for Range: Let,

$$y = \frac{x^2 - 169}{x - 13}$$

$$\Rightarrow y = \frac{x^2 - (13)^2}{x - 13}$$

$$\Rightarrow y = \frac{(x+13)(x-13)}{x - 13}$$

$\Rightarrow y = x + 13$

$\Rightarrow x = y - 13$

Here, x is defined for all values of y except $y=26$ since $x \neq 13$

$\therefore R_f = \mathbb{R} - \{26\}$

(11)

Here, $f(x) = \frac{-2}{\sqrt{x-10}}$

for, Domain, $f(x)$ is defiend for

$x - 10 > 0$

$\Rightarrow x > 10$

$\therefore D_f = \{x : x > 10\} = (10, \infty)$

for Range, lets,

$y = \frac{-2}{\sqrt{x-10}}$; $y > 0$

$\Rightarrow y^2 = \frac{2}{x-10}$

$\Rightarrow y^2(x-10) = 2$

$\Rightarrow x - 10 = \dfrac{2}{y^2}$

$\Rightarrow x = \dfrac{2}{y^2} + 10$

Here, x is defined for $y > 0$

$\therefore R_f = \{y : y > 0\} = (0, \infty)$

~~2 No Ans~~

2 NO Ans

1

$$\lim_{x \to 0} \frac{\sqrt{3+x} - \sqrt{3}}{x}$$

$$\Rightarrow \lim_{x \to 0} \frac{(\sqrt{3+x} - \sqrt{3})(\sqrt{3+x} + \sqrt{3})}{x(\sqrt{3+x} + \sqrt{3})}$$

$$\Rightarrow \lim_{x \to 0} \frac{(\sqrt{3+x})^2 - (\sqrt{3})^2}{x(\sqrt{3+x} + \sqrt{3})}$$

$$\Rightarrow \lim_{x \to 0} \frac{3+x-3}{x(\sqrt{3+x} + \sqrt{3})}$$

$$\Rightarrow \lim_{x \to 0} \frac{x}{x(\sqrt{3+x} + \sqrt{3})}$$

$$\Rightarrow \frac{0}{0(\sqrt{3+x} + \sqrt{3})}$$

$$\Rightarrow 0$$

(11)

$$\lim_{x\to\infty} \frac{\sqrt{7x + 36x^4}}{x - 6x^2}$$

$$\Rightarrow \lim_{x\to\infty} \frac{\sqrt{x^4\left(\frac{7}{x^3} + 36\right)}}{x^2\left(\frac{1}{x} - 6\right)}$$

$$\Rightarrow \lim_{x\to\infty} \frac{\sqrt{\frac{7}{x^3} + 36}}{\frac{1}{x} - 6}$$

$$\Rightarrow \frac{\sqrt{0+36}}{-6}$$

$$\Rightarrow \frac{6}{-6}$$

$$\Rightarrow -1$$

3 No Ans

At, $x = 0$

$\lim_{x \to 0_+} f(x) = \lim_{x \to 0_+} (1 - 2x) = 1$

$\lim_{x \to 0_-} f(x) = \lim_{x \to 0_-} (1 + 2x) = 1$

and

then, $x = 0$ when $f(x) = 1 - 2x = 1$

since, $\lim_{x \to 0_+} = \lim_{x \to 0_-} = f(x)$

So, the function $f(x)$ is contivous

at $x = 0$

At $x = \frac{1}{2}$

$\lim_{x \to \frac{1}{2}+} f(x) = \lim_{x \to \frac{1}{2}+} (-1 + 2x) = 0$

$$\lim_{x \to \frac{1}{2}-} f(x) = \lim_{x \to \frac{1}{2}-} (1-2x) = 0$$

and,

Then, $x = \frac{1}{2}$ when $f(x) = 1-2x = 0$

Since, $\lim_{x \to \frac{1}{2}+} = \lim_{x \to \frac{1}{2}-} = f(x)$

So, the function is continous

at $x = \frac{1}{2}$