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Answer to the question NO 1

(1) $f(n) \quad \frac{n^2-169}{n-13}$

$\rightarrow$ For Domain: $f(n)$ is not defined

$$n-13=0$$

$$\rightarrow n=13$$

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

For Range

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

$$\rightarrow y = \frac{n^2-(13)^2}{n-13}$$

$$\rightarrow y = \frac{(n+13)(n-13)}{n-13}$$

$$\rightarrow y = n+13$$

$$\rightarrow n = y-13$$

Answer to the Question No 1

(ii)

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

For Domain, $f(x)$ is defined for

$$x - 10 > 0$$
$$\rightarrow x > 10$$

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

For Range, let,

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

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

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

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

$$\rightarrow x = \frac{2}{y^2} + 10$$

Here, x is defined for $y > 0$

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

Answer to the Question No 2

(1)

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

$$\rightarrow \lim_{h \to 0} \frac{(\sqrt{3+h} - \sqrt{3})(\sqrt{3+h} + \sqrt{3})}{h(\sqrt{3+h} + \sqrt{3})}$$

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

$$\rightarrow \lim_{h \to 0} \frac{3+h-3}{h(\sqrt{3+h} + \sqrt{3})}$$

$$\rightarrow \lim_{h \to 0} \frac{h}{h(\sqrt{3+h} + \sqrt{3})}$$

$$\rightarrow \frac{0}{0\sqrt{3+0} + \sqrt{3})}$$

$\rightarrow 0$ (Ans)

Answer to the Question No 2

(1)

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

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

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

$$\to \frac{0}{0\sqrt{3+0} + \sqrt{3})}$$

$$\to 0 \quad \text{(Ans)}$$

Answer to the Question No 2

(ii) $\lim\limits_{x \to 2} \dfrac{\sqrt{7n + 36n^4}}{n - 6n^2}$

$\rightarrow \lim\limits_{n \to \alpha} \dfrac{\sqrt{n^4\left(\frac{7}{n^3} + 36\right)}}{n^2 \cdot \left(\frac{1}{n} - 6\right)}$

$\rightarrow \lim\limits_{n \to \alpha} \dfrac{\sqrt{\frac{7}{n^3} + 36}}{\cdot \frac{1}{n} - 6}$

$\rightarrow \dfrac{\sqrt{0 + 36}}{-6}$

$\rightarrow \dfrac{6}{-6}$

$= -1$ Ans.

3.

At $n = 0$

$$\lim_{n \to 0+} f(n) = \cancel{\quad} \lim_{n \to 0+} (1 - 2n) = 1$$

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

and

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

Since, $\lim_{n \to 0+} = \lim_{n \to 0-} f(n)$

so the function $f(n)$ is continous at $n =$

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

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

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

and then $n \frac{1}{2}$ when $f(n) = 1 - 2n = 0$

Since $\lim\limits_{x \to \frac{1}{2}^+} = \lim\limits_{x \to \frac{1}{2}^-} = f(x)$

So ~~the~~ function is ~~continait~~ continuous at

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