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 MICROTOPS
 MECHANICAL ENGINEERING

1.) If $\lim_{x \rightarrow 3} f(x) = \pi$

$x \rightarrow 3$

Then $\lim_{x \rightarrow 3} f(x) = \pi$

Since $\pi = 3.143$

$\therefore \lim_{x \rightarrow 3} f(x) = 3.143$

2.) $x = 6, \delta = 0.1$ Using step of 0.01

Condition x $f(x)$

Step of 0.01 $6 + 0.01$ $5(6.01) - 21 = 9.05$

$\delta = 0.1$ $6 + 0.1$ $5(6.1) - 21 = 9.5$

$x = 6$ 6 $5(6) - 21 = 9$

$\lim_{x \rightarrow 6} 5x - 21 = 9$

3.) $\lim_{x \rightarrow 3} \frac{3-x}{13-x}$

Using $x = 3$ $\lim_{x \rightarrow 3} \frac{3-3}{13-3} = \frac{0}{10}$ undefined

Using $x = 3.1$

$\lim_{x \rightarrow 3} \frac{3-3.1}{13-3.1} = \frac{-0.1}{9.9} = -0.01$

Using $x = 3.01$

$\lim_{x \rightarrow 3} \frac{3-3.01}{13-3.01} = \frac{-0.01}{9.99} = \frac{-0.01}{10} = -0.001$

$\therefore \lim_{x \rightarrow 3} \frac{3-x}{13-x} = -1$

$$4) \lim_{x \rightarrow 3^+} \frac{x-3}{|x-3|} \text{ one sided limit}$$

$$\lim_{x \rightarrow 3^+} = \frac{3-3}{|3-3|} = \frac{0}{0} = \text{un defined}$$

$$\text{Using } x = 3.01 = \frac{3.01-3}{|3.01-3|} = 1$$

$$\lim_{x \rightarrow 3^+} = 1$$

$$\lim_{x \rightarrow 3^-} \frac{x-3}{|x-3|} = \frac{0}{0} \text{ un defined}$$

$$\text{Using } x = 2.9 = \frac{2.9-3}{|2.9-3|} = -1$$

$$\lim_{x \rightarrow 3^-} \neq \lim_{x \rightarrow 3^+} \frac{x-3}{|x-3|} \therefore \lim_{x \rightarrow 3} \frac{x-3}{|x-3|} = \text{Does not exist}$$

Q) Show that the function given $f(x) = \sqrt{x-4}$ is continuous in the interval $[4, 8]$

Solution

Interval	$f(x)$
4	0
5	1
6	1.4
7	1.7
8	2

