



Continuity Ex 9.1 Q19

We have that the function is continuous at $x = 1$

$$\therefore \text{LHL} = \text{RHL} = f(1) \quad \dots (1)$$

Now,

$$\text{LHL} = \lim_{x \rightarrow 1^-} f(x) = \lim_{h \rightarrow 0} f(1-h) = \lim_{h \rightarrow 0} \frac{(1-h)^2 - 3(1-h) + 2}{(1-h) - 1} = \lim_{h \rightarrow 0} \frac{h^2 + h}{-h} = \lim_{h \rightarrow 0} -h - 1 = -1$$

$$f(1) = k$$

From (1), we get,

$$k = -1$$

Continuity Ex 9.1 Q20

We know that a function is continuous at 0 if

$$\text{LHL} = \text{RHL} = f(0) \quad \dots (1)$$

Now,

$$\text{LHL} = \lim_{x \rightarrow 0^-} f(x) = \lim_{h \rightarrow 0} f(0-h) = \lim_{h \rightarrow 0} \frac{\sin 5(-h)}{3(-h)} = \lim_{h \rightarrow 0} \frac{-\sin 5h}{-3h} = \lim_{h \rightarrow 0} \frac{\sin 5h}{5h} \times \frac{5h}{3h} = \frac{5}{3}$$

$$f(0) = k$$

Thus, from (1),

$$k = \frac{5}{3}$$

Continuity Ex 9.1 Q21

$$\text{The given function is } f(x) = \begin{cases} kx^2, & \text{if } x \leq 2 \\ 3, & \text{if } x > 2 \end{cases}$$

The given function f is continuous at $x = 2$, if f is defined at $x = 2$ and if the value of f at $x = 2$ equals the limit of f at $x = 2$

$$\text{It is evident that } f \text{ is defined at } x = 2 \text{ and } f(2) = k(2)^2 = 4k$$

$$\lim_{x \rightarrow 2^-} f(x) = \lim_{x \rightarrow 2^-} f(x) = f(2)$$

$$\Rightarrow \lim_{x \rightarrow 2^-} (kx^2) = \lim_{x \rightarrow 2^-} (3) = 4k$$

$$\Rightarrow k \times 2^2 = 3 = 4k$$

$$\Rightarrow 4k = 3 = 4k$$

$$\Rightarrow 4k = 3$$

$$\Rightarrow k = \frac{3}{4}$$

Therefore, the required value of k is $\frac{3}{4}$.

Continuity Ex 9.1 Q22

We have given that the function is continuous at $x = 0$

$$\text{So, LHL} = \text{RHL} = f(0) \quad \dots (1)$$

Now,

$$\text{LHL} = \lim_{x \rightarrow 0^-} f(x) = \lim_{h \rightarrow 0} f(0-h) = \lim_{h \rightarrow 0} \frac{\sin 2(-h)}{5(-h)} = \lim_{h \rightarrow 0} \frac{-\sin 2h}{-5h} = \lim_{h \rightarrow 0} \frac{\sin 2h}{2h} \times \frac{2h}{5h} = \frac{2}{5}$$

$$f(0) = k$$

$$\text{Using (1), } k = \frac{2}{5}$$

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