



Continuity Ex 9.1 Q45

It is given that the function is continuous at $x = 0$, then

$$LHL = RHL = f(0) \dots (1)$$

Now,

$$f(0) = k$$

$$RHL = \lim_{x \rightarrow 0^+} f(x) = \lim_{h \rightarrow 0} f(0 + h) = \lim_{h \rightarrow 0} \frac{h}{|h|} = 1 \dots (B)$$

Thus, using (1) we get,

$$k = 1$$

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Since the function is continuous at $x = 3$, therefore

$$LHL = RHL = f(3)$$

Now

$$\begin{aligned} RHL &= \lim_{x \rightarrow 3^-} f(x) \\ &= \lim_{h \rightarrow 0} f(3 + h) \\ &= \lim_{h \rightarrow 0} b(3 + h) + 3 \\ &= \lim_{h \rightarrow 0} 3b + 3h + 3 \\ &= 3b + 3 \end{aligned}$$

Again

$$\begin{aligned} f(3) &= a(3) + 1 \\ &= 3a + 1 \end{aligned}$$

Thus we can write

$$\begin{aligned} f(3) &= RHL \\ 3a + 1 &= 3b + 3 \\ 3a - 3b &= 2 \end{aligned}$$

***** END *****