If the function, g(x)=$\begin{cases} k\sqrt{x+1}, & 0 \le x \le 3 \\ mx+2, & 3 < x \le 5 \end{cases}$

is differentiable, then the value of $k+m$ is:

(1) $\frac{16}{5}$ (2) $\frac{10}{3}$

(3) 4 (4) 2

Solution

A differentiable function is continuous.

Hence, LHL=RHL at $x=3$

$\lim_{x\to 3-} k\sqrt{x+1} = \lim_{x\to 3+} mx+2$

$\therefore 2k = 3m+2$.....(*)

Also, LHD=RHD at $x=3$

$\frac{k}{2\sqrt{x+1}} = m$ at 3

$\therefore \frac{k}{4} = m$

$\Rightarrow k = 4m$.....(#)

From (*) and (#), m=$\frac{2}{5}$

$k+m = 4m+m = 5m = 2$

Hence, option (4).

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