



11. If the function $g(x) = \begin{cases} k\sqrt{x+1} & , 0 \leq x \leq 3 \\ mx+2 & , 3 < x \leq 5 \end{cases}$ is differentiable, then the value of $k+m$ is;

(1) 2

(2) $\frac{16}{5}$

(3) $\frac{10}{3}$

(4) 4

Answer: Since the function $g(x)$ is differentiable hence it must be continuous, therefore the left hand and right hand limit at 3 must be same.

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

$$\text{or } 2k = 3m + 2 \rightarrow (1)$$

we can differentiate for left and right hand limit and get

$$\frac{k}{2\sqrt{3+1}} = m \text{ or } k = 4m \rightarrow (2)$$

putting the value of k in (1) we get

$$8m = 3m + 2$$

$$\text{or } 5m = 2$$

$$\text{or } m = \frac{2}{5}$$

$$\text{Therefore } k + m = 4 \times \frac{2}{5} + \frac{2}{5} = \frac{10}{5} = 2$$

Therefore correct answer is (1) 2