Que: Solve for x : $(2x+1) + \frac{3}{(2x+1)} = 4$, where $x \neq -\frac{1}{2}$

Sol^n:

$$\Rightarrow \frac{(2x+1)^2 + 3}{(2x+1)} = 4$$

$$\Rightarrow (2x+1)^2 + 3 = 4(2x+1)$$

$$\Rightarrow (2x+1)^2 - 4(2x+1) + 3 = 0$$

let $2x+1 = p$

$$\Rightarrow p^2 - 4p + 3 = 0$$

$$\Rightarrow p^2 - 3p - p + 3 = 0$$

$$\Rightarrow p(p-3) - 1(p-3) = 0$$

$$\Rightarrow (p-3)(p-1) = 0$$

either $(p-3) = 0 \Rightarrow p = 3$

or, $p-1 = 0 \Rightarrow p = 1$

i.e $p = 3 \Rightarrow 2x+1 = 3 \Rightarrow 2x = 2 \Rightarrow x = 1$

and $p = 1 \Rightarrow 2x+1 = 1 \Rightarrow 2x = 0 \Rightarrow x = 0$

$\therefore$ $x = 0, 1$ are the required values of x.