The sum of possible values of x for

$\tan^{-1}(x+1) + \cot^{-1}\left(\frac{1}{x-1}\right) = \tan^{-1}\left(\frac{8}{31}\right)$ is :

A $-\frac{32}{4}$

B $-\frac{33}{4}$

C $-\frac{31}{4}$

D $-\frac{30}{4}$

$\tan^{-1}(x+1) + \cot^{-1}\left(\frac{1}{x-1}\right) = \tan^{-1}\left(\frac{8}{31}\right)$

$\Rightarrow \tan^{-1}(x+1) + \tan^{-1}(x-1) = \tan^{-1}\left(\frac{8}{31}\right)$

$\Rightarrow \tan^{-1}\left(\frac{(x+1)+(x-1)}{1-(x+1)(x-1)}\right) = \tan^{-1}\left(\frac{8}{31}\right)$

$\Rightarrow \frac{(1+x)+(x-1)}{1-(1+x)(x-1)} = \frac{8}{31}$

$\Rightarrow \frac{2x}{2-x^2} = \frac{8}{31}$

$\Rightarrow 4x^2 + 31x - 8 = 0$

$\Rightarrow x = -8, \frac{1}{4}$

but at $x = \frac{1}{4}$

$LHS > \frac{\pi}{2}$ and $RHS < \frac{\pi}{2}$

So, only solution is x = $-$ 8 = $-\frac{32}{4}$