Q3. Solve $\frac{dy}{dx} = (4x+y+1)^2$

Sol: This can be converted to variable sep form. How we Know that?: because other two methods don't work here. Always Remember linear eqn (like $4x+y+1$) can easily be assumed another variable.

So let $4x+y+1 = v$

$$4 + \frac{dy}{dx} = \frac{dv}{dx}$$

$\rightarrow \frac{dv}{dx} = v^2 + 4$ from $\frac{dy}{dx} = (4x+y+1)^2$

$$\frac{1}{2}\tan^{-1}\left(\frac{v}{2}\right) = x + c$$

now put the value of v back.

$$\boxed{\frac{1}{2}\tan^{-1}\left(\frac{4x+y+1}{2}\right) = x + c}$$