$A[x\_]:=\text{Piecewise}[\{\{0.1, 1 \leq x < 3\}, \{0.5 * (x-1), 3 \leq x \leq 5\}\}];$

$b[x\_]:=\text{FullSimplify}[\text{Piecewise}[\{\{10, 1 \leq x < 3\}, \{0, 3 \leq x \leq 5\}\}]];$

$\text{innerIntegral}[r\_]:=\text{FullSimplify}[\text{Integrate}[b[s], \{s, 1, r\}, \text{Assumptions} \to 1 < r < 5] + 150 * \text{HeavisideTheta}[r-3]];$

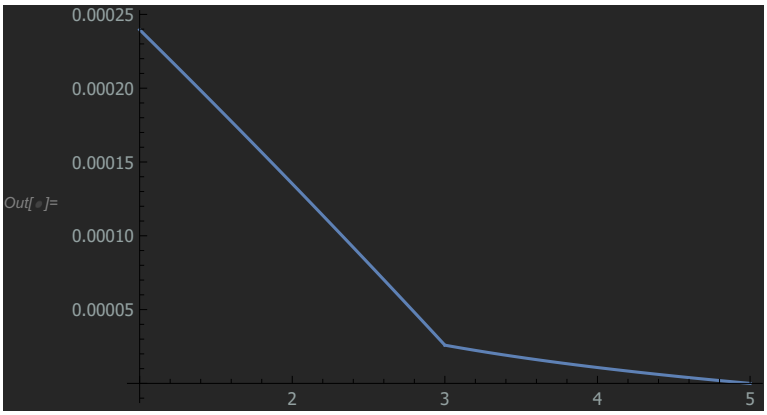
$$\text{c1} = \text{FullSimplify}\left[\frac{\text{NIntegrate}\left[\frac{1}{20*10^6*A[r]} * \text{innerIntegral}[r], \{r,5,1\}\right]}{\text{NIntegrate}\left[\frac{0.1}{A[s]}, \{s,5,1\}\right]}\right]$$

0.0000377507

$$\text{usol}[x\_]:=\text{FullSimplify}\left[-\text{Integrate}\left[\frac{1}{20*10^6*A[r]} * \text{innerIntegral}[r], \{r, 5, x\}, \text{Assumptions} \to 1 \leq x \leq 5\right] + \text{c1} * \text{Integrate}\left[\frac{1}{A[s]}, \{s, 5, x\}, \text{Assumptions} \to 1 \leq x \leq 5\right]\right];$$

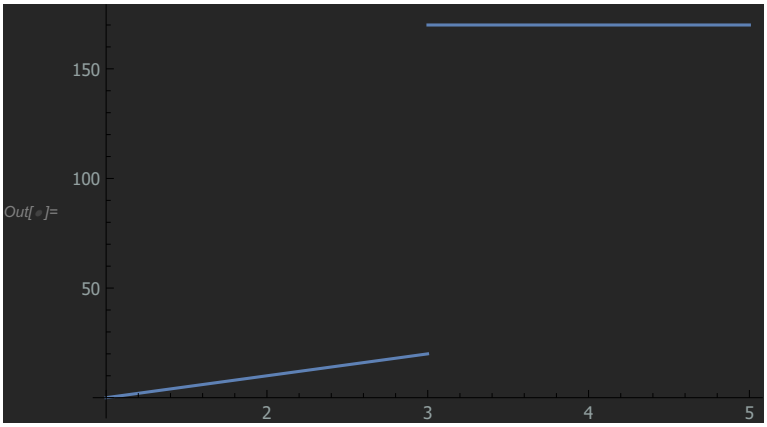
$\text{ue} = \text{FullSimplify}[\text{usol}[x]];$

$\text{Plot}[\text{ue}, \{x, 1, 5\}]$



$\text{inn} = \text{innerIntegral}[x];$

$\text{Plot}[\text{inn}, \{x, 1, 5\}]$


150
100
Out[ ]=
50
2
3
4
5