Worksheet 3/11/2026

Solve the initial value problem $y' = \frac{1}{x+y}$, $y(0) = 1$ on the interval $[0,1]$ using step size $h = 0.25$.

1) Use forward Euler method $y_{k+1} = y_k + hf_k$

2) Use backward Euler method $y_{k+1} = y_k + hf_{k+1}$

3) Use Trapezoid method $y_{k+1} = y_k + \frac{h}{2}(f_k + f_{k+1})$

4) Use Heun's method $y_{k+1} = y_k + \frac{h}{2}(f_k + f(x_{k+1}, y_k + hf_k))$