Using *Laplace* transforms to solve integral equation

$$y(t) = 1 + t + \int_0^t (t - u).y(u)du$$

$$L[y(t)] = Y(s)$$

$$L[1 + t] = \frac{1}{s} + \frac{1}{s^2} = \frac{s+1}{s^2}$$

$$L[\int_0^t (t-u).y(u)du] = L[t] \times L[y(t)] = \frac{Y(s)}{s^2}$$

$$Y(s) = \frac{s+1}{s^2} + \frac{Y(s)}{s^2}$$

$$\frac{(s^2-1)\,Y(s)}{s^2} = \frac{s+1}{s^2}$$

$$Y(s) = \frac{1}{s-1}$$

Therefore $y(t) = e^t$ where $t > 0$