1. Solve the linear first-order DE $y' + 3y = 2$.

2. Solve the following linear first-order IVP. You must do something small but critical first!

$$2y' + 2y \cos t = \cos t \text{ with } y\left(\tfrac{\pi}{4}\right) = -1$$

3. Find the interval of existence of the solution to the IVP:

$$y' + \sqrt{t}y = \frac{1}{t-7} \text{ with } y(2) = 17$$

4. Write down the integral-form solution of each of the following DEs but do not integrate.

(a) $y' - ye^{2t} = \cos(t^2)$

(b) $f'(x) + x^4 f(x) = \frac{1}{x+1}$

(c) $y' + \frac{y}{t+1} = \tan(t^2 - 1)$