Calculus II - Quiz 1

Please show all your work! Answers without supporting work will not be given credit. Simplify answers wherever possible.

(1) (10 points) Solve the following differential equation:

$$\frac{dy}{dx} = \frac{(x+1)\sec y}{x^2 - x}$$

(2) (Bonus) Find the equilibrium points for the following differential equation and classify them

$$\frac{dy}{dx} = e^y(y-1)(y+1)$$

For the initial condition $y(0) = 0$ find $\lim_{x\to\infty} y(x)$?

(3) (20 points) Evaluate the following integrals:

(a)

$$\int_1^\infty \frac{\ln(x)}{x}dx$$

(b)

$$\int_{-\infty}^0 \frac{1}{(2x-3)^2}dx$$

(c)

$$\int_1^\infty x^2\ln(x)dx$$

(d)

$$\int_{-\infty}^\infty \frac{e^x}{e^{2x}+1}dx$$