Present neatly on separate paper. Justify for full credit. No Calculators.
Name _____Score _____ 15 minutes **Weight: 5**

1)

Solve for the general solution of the differential equation:

$$\frac{dy}{dx} = ye^x + y$$

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

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

$$\int \frac{1}{y}\,dy = \int (e^x + 1)\,dx$$

$$\ln|y| = e^x + x + C$$

$$|y| = e^{e^x + x + C}$$

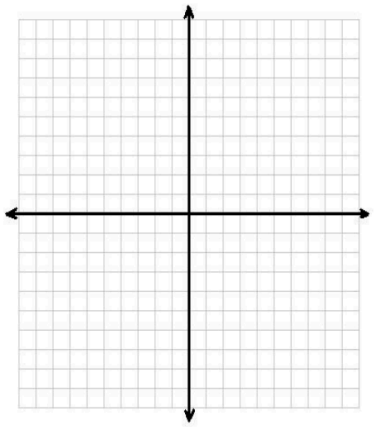
$$y = \pm e^{e^x + x + C} = \pm A\,e^{e^x + x}$$

2)

Describe the differential equation in as much detail as possible using a slope field.

$$\frac{dy}{dx} = \frac{1}{xy}$$

Your slope field window should have dimensions [-3, 3] by [-3, 3]. Include the graph of a typical solution with an initial condition of your choice.



Description: The slope at a point (x, y) is given by 1 / (x y). Along the coordinates axes, the slopes are undefined because x=0 and y=0 makes the derivative undefined. The slope signs in quadrants 1 through 4 are: positive, negative, positive, negative, respectively.

Below is a slope field with a range of -3 to 3 in both directions. Note that you needed to add a typical solution here, which could look like a parabola opening to the right and symmetric about the x-axis if, let's say, the initial condition is (1, 1).