Quiz 17

Name: _____

1. Solve this first-order DE with initial condition using separation of variables.
$$\frac{dy}{dt} = 2y, \qquad y(0) = -1.$$

$$\frac{1}{2y}\,dy = dt$$
$$\int \frac{1}{2y}\,dy = \int dt$$
$$\frac{1}{2}\ln|y| = t + C$$
$$\ln|y| = 2t + C$$
$$|y| = e^C e^{2t}$$
$$y = \pm e^C e^{2t}.$$

Now, $y = -1$ with $t = 0$:
$$-1 = \pm e^C e^0$$

we need to choose the minus sign because e^C will always be positive, so $1 = e^C$, giving $C = 0$. The solution is then

$$y(t) = -e^{2t}.$$