 Name_____

Separable Differential Equations

Date_____ Period____

Find the general solution of each differential equation.

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

2) $\frac{dy}{dx} = \frac{1}{\sec^2 y}$

3) $\frac{dy}{dx} = xe^{y}$

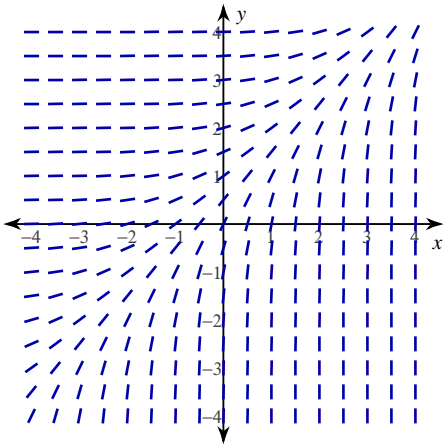
4) $\frac{dy}{dx} = \frac{2x}{e^{2y}}$

5) $\frac{dy}{dx} = 2y - 1$

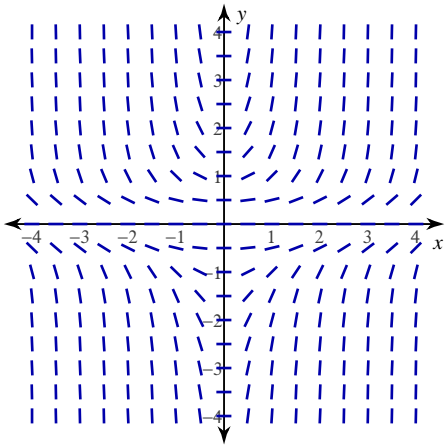
6) $\frac{dy}{dx} = 2yx + yx^2$

For each problem, find the particular solution of the differential equation that satisfies the initial condition. You may use a graphing calculator to sketch the solution on the provided graph.

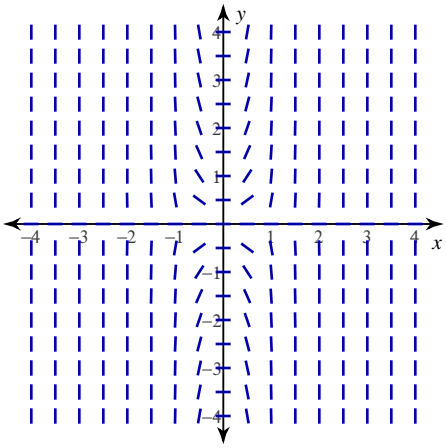
7) $\frac{dy}{dx} = 2e^{x-y},\ y(1) = \ln(2e+1)$



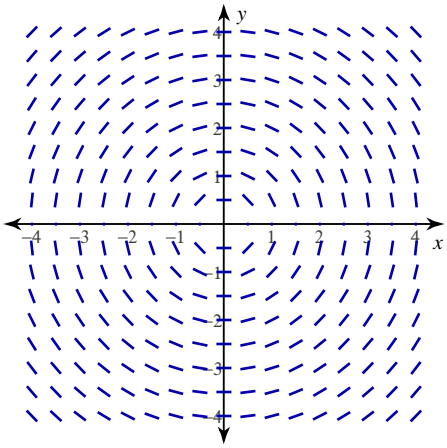
8) $\frac{dy}{dx} = xy^2,\ y(2) = -\frac{2}{5}$



9) $\frac{dy}{dx} = 12x^3y,\ y(0) = 2$



10) $\frac{dy}{dx} = -\frac{x}{y},\ y(1) = -\sqrt{2}$



 Name_____

Separable Differential Equations

Date_____ Period____

Find the general solution of each differential equation.

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

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

$y = \ln\left(e^{x} + C\right)$

2) $\frac{dy}{dx} = \frac{1}{\sec^2 y}$

$\tan y = x + C$

$y = \tan^{-1}\left(x + C\right)$

3) $\frac{dy}{dx} = xe^{y}$

$-e^{-y} = \frac{x^2}{2} + C_1$

$y = -\ln\left(-\frac{x^2}{2} + C\right)$

4) $\frac{dy}{dx} = \frac{2x}{e^{2y}}$

$\frac{e^{2y}}{2} = x^2 + C_1$

$y = \frac{\ln\left(2x^2 + C\right)}{2}$

5) $\frac{dy}{dx} = 2y - 1$

$\frac{\ln\left|2y - 1\right|}{2} = x + C_1$

$y = \frac{Ce^{2x} + 1}{2}$

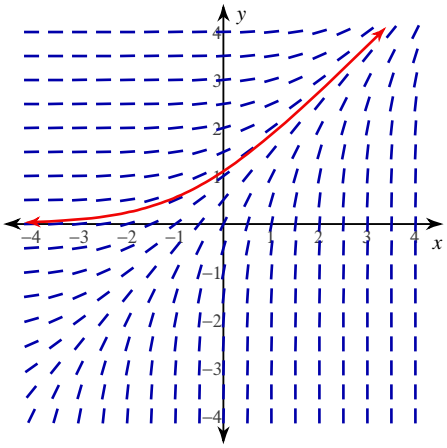
6) $\frac{dy}{dx} = 2yx + yx^2$

$\ln\left|y\right| = x^2 + \frac{x^3}{3} + C_1$

$y = Ce^{x^2 + \frac{x^3}{3}}$

For each problem, find the particular solution of the differential equation that satisfies the initial condition. You may use a graphing calculator to sketch the solution on the provided graph.

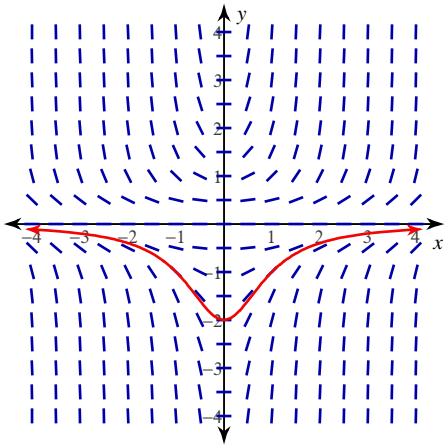
7) $\frac{dy}{dx} = 2e^{x-y},\ y(1) = \ln(2e+1)$



$e^y = 2e^x + 1$

$y = \ln(2e^x + 1)$

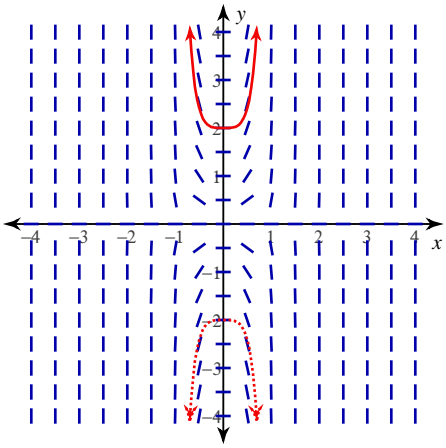
8) $\frac{dy}{dx} = xy^2,\ y(2) = -\frac{2}{5}$



$-\frac{1}{y} = \frac{x^2}{2} + \frac{1}{2}$

$y = -\frac{2}{x^2+1}$

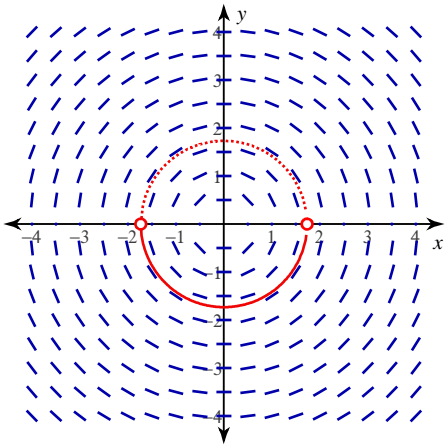
9) $\frac{dy}{dx} = 12x^3y,\ y(0) = 2$



$\ln|y| = 3x^4 + \ln 2$

$y = 2e^{3x^4}$

10) $\frac{dy}{dx} = -\frac{x}{y},\ y(1) = -\sqrt{2}$



$\frac{y^2}{2} = -\frac{x^2}{2} + \frac{3}{2}$

$y = -\sqrt{-x^2+3},\ -\sqrt{3} < x < \sqrt{3}$