

Math 285 Sample Exam 1 Version A

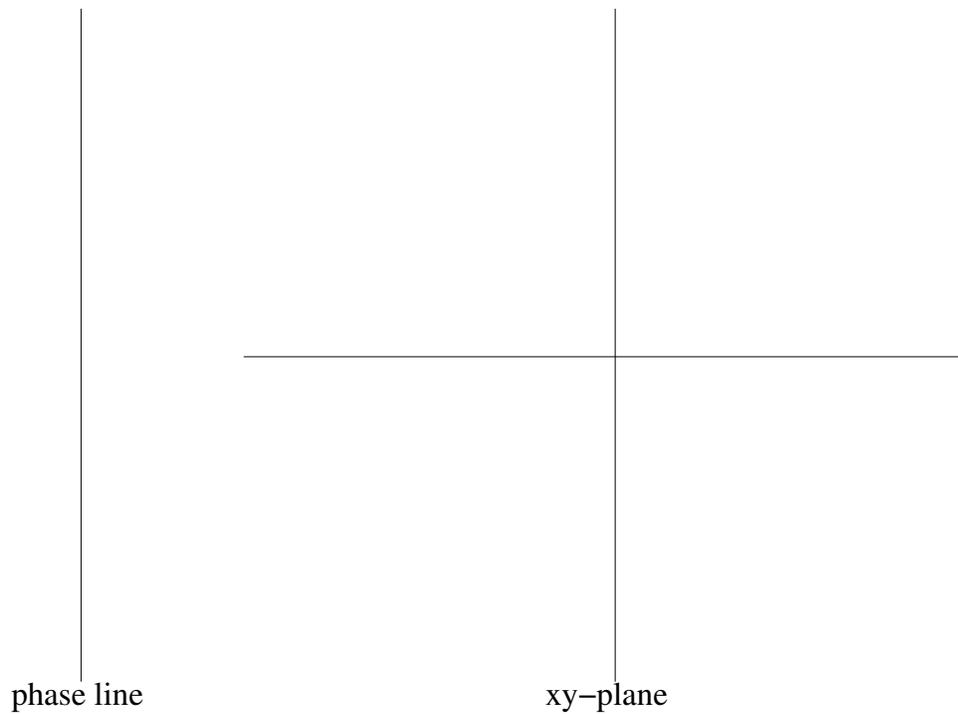
1. Solve the initial value problem $y' + 3y = e^{-3x}$ with $y(0) = 7$.

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2. Solve $(e^{2y} - y)(\cos x) \frac{dy}{dx} = e^y \sin 2x$ with $y(0) = 0$.

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3. Draw a phase portrait and solution curves for the autonomous first-order ordinary differential equation $y' = y^3 - 5y$ below. Label the stationary points and determine whether they are stable, unstable or semi-stable.



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4. Show that the ordinary differential equation

$$(y \cos x + 2xe^y)dx + (\sin x + x^2e^y + 2)dy = 0$$

is exact and find the general solution.

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5. Find the unique solution to $\frac{dy}{dx} = \frac{2x}{1+2y}$ with $y(0) = 1$.

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6. Find the general solution to the differential equation

$$(y^2 + 2xy)dx - x^2dy = 0.$$

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7. Find the general solution to the differential equation

$$x \frac{dy}{dx} + y = x^2 y^2.$$