Slope Fields Name: Answer Key

1) Determine whether the function y = 3cos(2x) is a solution of the differential equation $y^{(4)} - 16y = 0$.

$y' = -6\sin(2x)$

$y'' = -12\cos(2x)$

$y''' = 24\sin(2x)$

$y^{(4)} = 48\cos(2x)$

$y^{(4)} - 16y = 0$

$48\cos(2x) - 16(3\cos(2x)) = 0$

$48\cos(2x) - 48\cos(2x) = 0$

$0 = 0$ ✓ $y = 3\cos(2x)$ is a solution

2) Determine whether the function $y = x^2e^x$ is a solution to the differential equation $xy' - 2y = x^3e^x$.

$y' = x^2(e^x) + e^x(2x)$

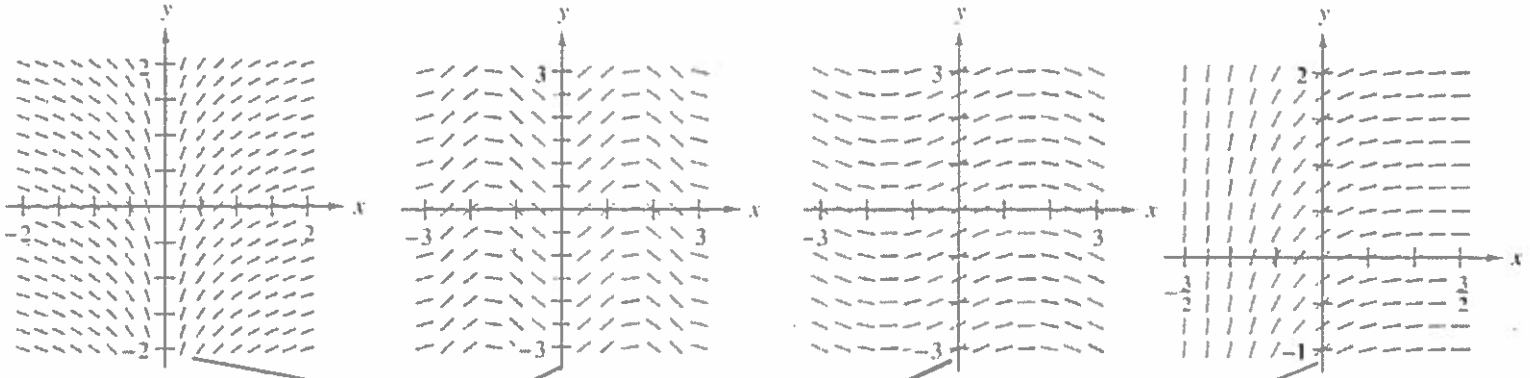
$xy' - 2y = x^3e^x$

$x(x^2e^x + 2xe^x) - 2(x^2e^x) = x^3e^x$

$x^3e^x + 2x^2e^x - 2x^2e^x = x^3e^x$

$x^3e^x = x^3e^x$ ✓ $y = x^2e^x$ is a solution

3) Match the slope fields with the differential equations. Draw a line to connect each pair.



$\frac{dy}{dx} = \sin(2x)$

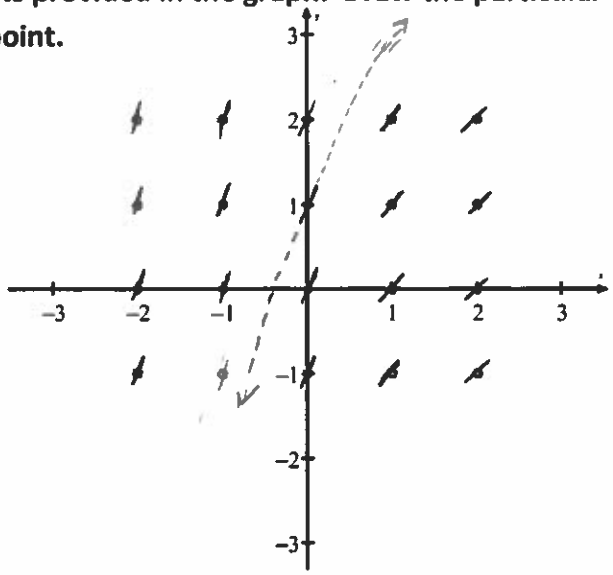
$\frac{dy}{dx} = \frac{1}{2}\cos x$

$\frac{dy}{dx} = e^{-2x}$

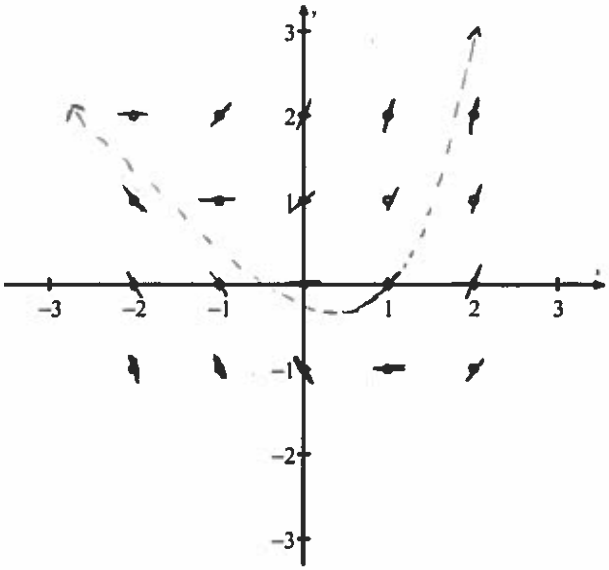
$\frac{dy}{dx} = \frac{1}{x}$

Draw the slope field for each differential equation on the points provided in the graph. Draw the particular solution for each differential equation through the indicated point.

5) $y' = 3 - x$; (0, 1)



6) $y' = x + y$; (1, 0)



7) $y' = xy - y$; (-1, 1)