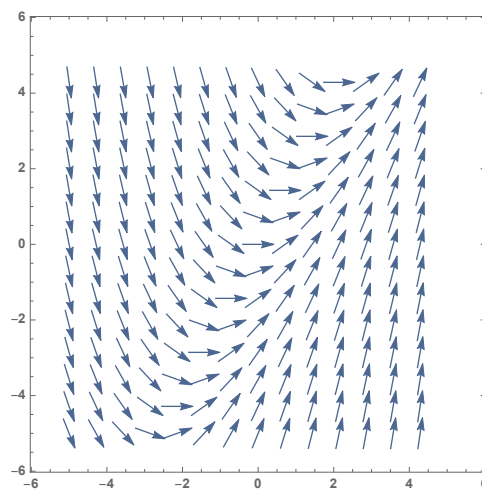
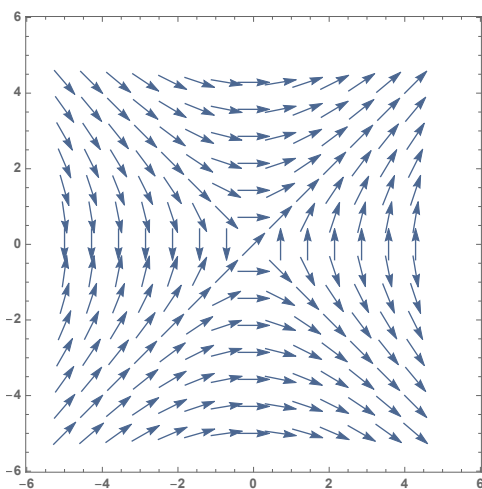
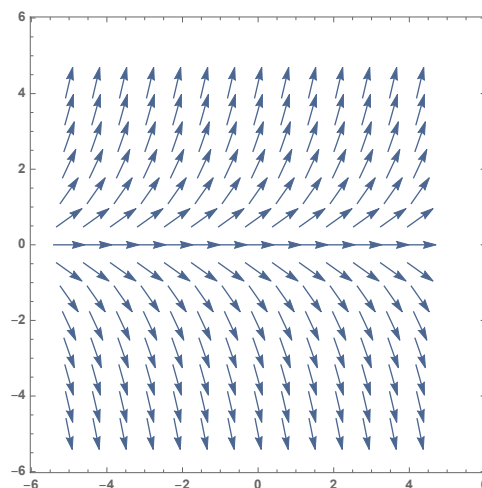
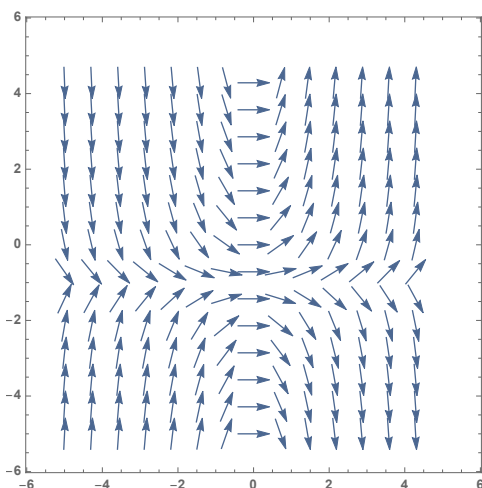


Match the differential equation to the corresponding vector field,

$$\frac{dy}{dx} = y \quad \frac{dy}{dx} + \frac{1}{2}y = x \quad \frac{dy}{dx} = x(y + 1) \quad \frac{dy}{dx} = \frac{x}{y}$$



Solve the following first order differential equations using any method of your choosing,

$$(1) \quad y' = \frac{y(x+2)}{x}$$

$$(2) \quad \frac{dy}{dx} = x^2y + x^5, \quad y(0) = 1$$

$$(3) \quad y' = (x^2 + 1)y$$

$$(4) \quad y' - 2y = x^2e^{2x}, \quad y(0) = 2$$

$$(5) \quad x \frac{dy}{dx} = y + x^2 \sin x, \quad y(\pi) = 0$$

$$(6) \quad x^2y' + 2xy = 1$$

Solve the following second order differential equations using any method of your choosing,

$$(1) \quad y'' - 3y' + 2y = 0$$

$$(2) \quad y'' + 4y' + 4y = e^x, \quad y(0) = 1, \quad y'(0) = -1.$$

$$(3) \quad y'' + 9y = \sin x + \cos x$$

$$(4) \quad y'' - y' = e^x + x, \quad y(0) = 1, \quad y'(0) = 1$$

$$(5) \quad y'' + 4y = 8$$

$$(6) \quad y'' - 2y' + 4y = 8x - 12 \sin(2x), \quad y(0) = -2, \quad y'(0) = 8$$