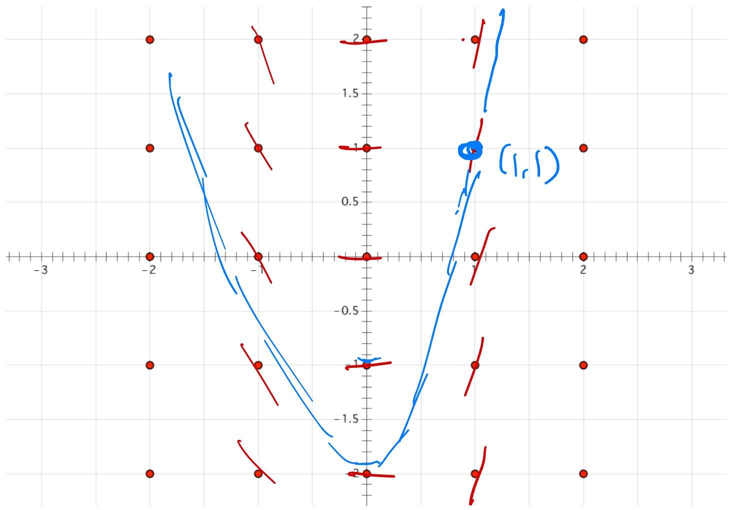
Worksheet Assignment 6.3 NAME fr Chris

Feb 9 2022

a) Given the differential equation $y' = 3x$, sketch the slope field on the grid below.



b) Sketch two possible solutions to the slope field one going through the point $(1,1)$ and the other through the point $(0,-2)$.

c) Solve for the general solution to the differential equation above.

$$\frac{dy}{dx} = 3x$$

$$\int dy = 3\int x \, dx$$

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

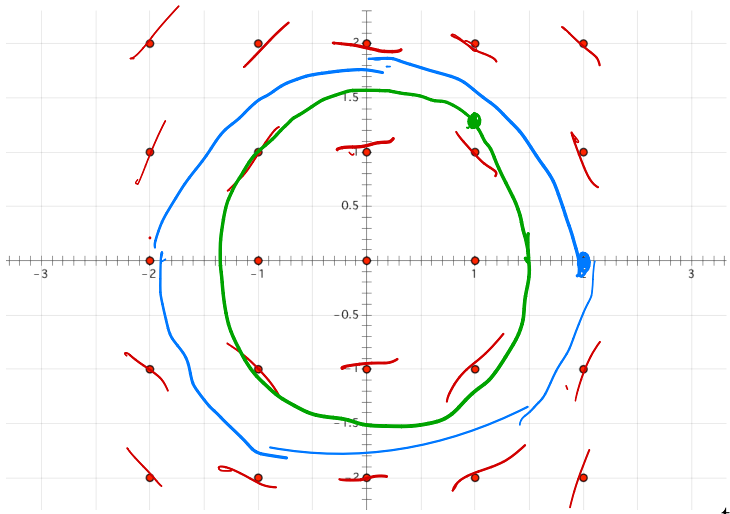
d) Solve for the particular solution to the differential equation that goes through the point $(1,1)$.

$$1 = \frac{3}{2}(1)^2 + C$$

$$C = -1/2$$

$$y = \frac{3}{2}x^2 - \frac{1}{2}$$

a) Given the differential equation $y' = -\dfrac{2x}{3y}$, sketch the slope field on the grid below.



b) Sketch two possible solutions to the slope field one going through the point $(2,0)$ and the other through the point $\left(1,\sqrt{2}\right)$.

c) Solve for the general solution to the differential equation above.

$$\frac{dy}{dx} = \frac{-2x}{3y}$$

$$\int 3y\,dy = -2\int x\,dx$$

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

$$3y^2 = -2x^2 + C$$

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

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

d) Solve for the particular solution to the differential equation that goes through the point $\left(1,\sqrt{2}\right)$.

$$2 = -\frac{2}{3}(1)^2 + C$$

$$C = 2 + \frac{2}{3} = \frac{8}{3}$$

$$y = +\sqrt{-\frac{2}{3}x^2 + \frac{8}{3}}$$