

Introduction to SP

$$\frac{dy}{dx} = g(x)f(y)$$

$$h(y) = \frac{1}{g(y)}$$

$$\frac{dy}{dx} = \frac{g(x)}{h(y)}$$

$$\frac{h(y)}{dy} = \frac{g(x)}{dx}$$

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

Draw directinal field

second ex

$$\frac{dy}{dx} = \frac{6x^2}{2y + \cos y}$$

$$\int (2y + \cos y) dy = \int 6x^2 dx$$

$$y^2 + \sin y = 2x^3 + c$$

Third ex

$$y' = x^2 y$$

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

$$\int dy y = \int x^2 dx$$

$$\ln |y| = \frac{1}{3} x^3 + c$$

$$e^{\ln |y|} = e^{\frac{1}{3} x^3 + c}$$

$$|y| = A e^{\frac{1}{3} x^3}$$

this is not function due to y, this is relation

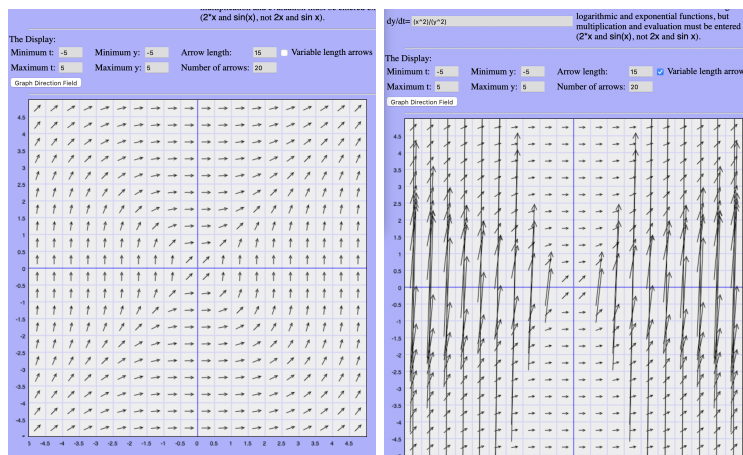
ex 4

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

$$\int y^2 dy = \int x^2 dx$$

$$\frac{1}{3}y^3 = \frac{1}{3}x^3 + c$$

$$y = \sqrt[3]{3x^3 + c}$$



(a) unit arrow

(b) Variable length arrow