

Differential Equation

Solve the initial value problem

Starting Point

$$15) \int \frac{dy}{dx} = \frac{-1}{x^2} - \frac{3}{x^4} + 12 \quad \text{and } y=3 \text{ when } x=1$$

(1, 3)

$$y = \int -x^{-2} - 3x^{-4} + 12$$

$$y = x^{-1} + x^{-3} + 12x + C \rightarrow 6$$

$$y = \frac{1}{x} + \frac{1}{x^3} + 12x + C \rightarrow 6$$

$$y = \frac{1}{x} + \frac{1}{x^3} + 12x - 11$$

$$3 = \frac{1}{1} + \frac{1}{1} + 12(1) + C$$

$$3 = 14 + C$$

$$-11 = C$$

$$16) \int \frac{dy}{dx} = \sec^2 x - \frac{3}{2}x^{1/2} \quad y(0)=7$$

(0, 7)

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

$$7 = \tan(0) - (0)^{3/2} + C$$

$$7 = C$$

$$y = \tan x - x^{3/2} + 7$$