

Answer on Question #79196 – Math – Differential Equations

Question

Solve the differential equation $y' = x(1 + y^2)$

$$y = \tan\left(\frac{x}{2} + c\right)$$

$$y = -\tan\left(\frac{x}{2} + c\right)$$

$$y = -\tan\left(\frac{x^2}{2} + c\right)$$

$$y = \tan\left(\frac{x^2}{2} + c\right)$$

Solution

$$y' = x(1 + y^2)$$

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

$$\frac{dy}{1 + y^2} = x dx$$

$$\int \frac{1}{1 + y^2} dy = \int x dx$$

$$\arctan y = \frac{x^2}{2} + c$$

$$y = \tan\left(\frac{x^2}{2} + c\right)$$

Answer: the fourth option is correct, $y = \tan\left(\frac{x^2}{2} + c\right)$.