

5.7 More Differential Equations

ESSENTIAL QUESTIONS:

How do we

1. Verify solutions to differential eqns?
2. Find a particular solution to a diff. eqn?

Verify that $y = \frac{2}{3}(e^{-2x} + e^x)$ is a solution to the differential equation $y'' + 2y' = 2e^x$.

1. Find y' and y'' .
2. Substitute y' and y'' into the differential equation.

Verify that $2x^2 + 3y^2 = C$ is a solution to the differential eqn $2x + 3yy' = 0$. Then find the particular solution if $y = 2$ when $x = 1$.

Find a general solution to $y' = x \cos(x^2)$.

Use separation of variables to find a particular solution to

$$\frac{dy}{dx} = \frac{x^2 + 2}{3y^2} \quad \text{given that } y(0) = 1.$$

Solve $dP - kPdt = 0$ if $P(0) = P_0$.