

7B Homogeneous Second Order Differential Equations

$$a \frac{d^2 y}{dx^2} + b \frac{dy}{dx} + cy = 0$$

Solve the equation:

$$a \frac{dy}{dx} + by = 0$$

Case 1: $b^2 > 4ac$

Find $\frac{dy}{dx}$ and $\frac{d^2 y}{dx^2}$ when

$$y = Ae^{mx}$$

Find the auxiliary equation for

$$a \frac{d^2 y}{dx^2} + b \frac{dy}{dx} + cy = 0$$

Summary: when $b^2 > 4ac$ then the solution will be in the form...

1. Find the general solution of the equation:

$$\frac{d^2 y}{dx^2} - 7 \frac{dy}{dx} + 12y = 0$$

Case 2: $b^2 = 4ac$

Show that

$$y = (A + Bx)e^{3x}$$

Satisfies the equation:

$$\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 9y = 0$$

Summary: If $b^2=4ac$ then the solution will be in the form...

2. Find the general solution of the equation:

$$\frac{d^2y}{dx^2} + 8\frac{dy}{dx} + 16y = 0$$

Case 3: $b^2 < 4ac$

Find the general solution of the differential equation:

$$\frac{d^2y}{dx^2} + 16y = 0$$

3. Find the general solution of the differential equation:

$$\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 34y = 0$$

Summary: If $b^2=4ac$ then the solution will be in the form...

