

Solve for the general solution to the equation.

1. $y = y''$

2. $y'' - 2y' - 15y = 0$

3. $y'' + 3y' + 2y = 0$

4. $y'' - \frac{1}{4}y = 0$

5. $y'' - 3y' - 4y = 0$

6. $y'' - 7y' + 12y = 0$

7. Show that xe^x is a solution to the differential equation $y'' - 2y' + 1 = 0$.

8. Show that $\sin(3x)$ is a solution to the differential equation $y'' + 9y = 0$.