

$$y'' + 6y' + 9y = x^{-3} e^{3x}$$

$$y = A x^{-1} e^{3x}$$

$$r^2 + 6r + 9 = 0$$

$$y' = -A x^{-2} e^{3x} + 3A x^{-1} e^{3x}$$

$$(r+3)(r+3)$$

$$y'' = 2A x^{-3} e^{3x} + 3A x^{-2} e^{3x} - 3A x^{-2} e^{3x} + 9A x^{-1} e^{3x}$$

$$y = C_1 e^{3x} + C_2 x e^{3x}$$

$$2A x^{-3} e^{3x} - 6A x^{-2} e^{3x} + 9A x^{-1} e^{3x} - 6A x^{-2} e^{3x} + 18A x^{-1} e^{3x} + 9A x^{-1} e^{3x} = x^{-3} e^{3x}$$

$$2A x^{-3} - \cancel{6A x^{-2}} + \cancel{9A x^{-1}} + \cancel{18A x^{-1}} + 9A x^{-1} e^{3x} = x^{-3} e^{3x}$$

$$y = C_1 e^{3x} + C_2 x e^{3x} + \frac{1}{2} x^{-1} e^{3x}$$

Pop Quiz at the Beginning of Class

With this Problem. Due Both Varying Parameters and Undetermined Determinants

Methods For

$$y'' - 4y' + 3y = 8e^{3x}$$