

11.47

1 11.47, §1 Asked

Solve:

$$y'' - 2y' + y = 3e^x$$

2 11.47, §2 Solution

$$y'' - 2y' + y = 3e^x$$

Homogeneous equation:

$$y_h = C_1 e^x + C_2 x e^x$$

Particular solution:

$$y_p'' - 2y_p' + y_p = 3e^x$$

Particular solutions $y_p = e^x$ or $y_p = x e^x$ don't work. Try

$$y_p = C e^x x^2 \quad y_p' = C e^x (x^2 + 2x) \quad y_p'' = C e^x (x^2 + 4x + 2)$$

$$y_p'' - 2y_p' + y_p = C e^x 2$$

so $C = 1.5$.

Total solution:

$$y = 1.5x^2 e^x + C_1 e^x + C_2 x e^x$$

