

KMÜ 237-21/22 Engineering Mathematics

HOMEWORK 1 (Due November 1, 2018)

1. Show that

$$y = C_1 e^x + C_2 e^{2x} + x$$

is the primitive of the differential equation

$$\left(\frac{d^2 y}{dx^2}\right) - 3\left(\frac{dy}{dx}\right) + 2y = 2x - 3$$

2. Determine whether the differential equations are homogeneous and if so, solve them.

a) $y' = \frac{2y + x}{x}$

b) $y' = \frac{2xy}{y^2 - x^2}$

3. Solve the given initial value problems .

a) $y' = \frac{x^2 y - y}{y + 1}$; $y(3) = -1$

b) $(x^2 + 1)dx + \frac{1}{y}dy = 0$; $y(-1) = 1$

4. Find an appropriate integrating factor for each differential equation and solve them.

a) $(y + 1)dx - xdy = 0$

b) $2xydx + y^2dy = 0$

5. Solve the given differential equations

a) $y' - 7y = e^x$

b) $y' - 7y = \sin 2x$

c) $y' + y = y^{-2}$