Sharjah Institute of Technology

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Differential Equations Tutoring Sheet #16

1. Solve the following Differential Equations:

   a. $y'' = xe^x$

   b. $2\sqrt{x}\dfrac{dy}{dx} = x^2 - 1$

   c. $(2x + 3y)dx + (y - x)dy = 0$

   d. $y\dfrac{dy}{dx} = \sqrt{y^2 + 1}$

   e. $x^3\,dx + (y+1)^2\,dy = 0$

   f. $\dfrac{dy}{dx} = \dfrac{y(x+2y)}{x(2x+y)}$

2. Solve the following differential equations:

   a. $\dfrac{dy}{dx} + 2y = 8x^2 - 2$

   b. $x\dfrac{dy}{dx} + 3y = 2x + 5$

   c. $x^2\dfrac{dy}{dx} + xy + y = 0$

   d. $\dfrac{dy}{dx} = (x+y)^2$

   e. $\dfrac{d^2y}{dx^2} - \dfrac{dy}{dx} - 6y = 3x^2 + x + 2$ If y = 1 and $\dfrac{dy}{dx} = 1$ when x= 0

   f. $\dfrac{d^2y}{dx^2} - \dfrac{dy}{dx} - 2y = e^{2x}$

   g. $\dfrac{d^2y}{dx^2} - 2\dfrac{dy}{dx} - y = \sin x$

   h. $\dfrac{d^2y}{dx^2} + y = \sin x + \cos x$

   i. $\dfrac{d^2y}{dx^2} + \dfrac{dy}{dx} - 6y = e^{2x}\cos x$

   j. $\dfrac{d^2y}{dx^2} - 4\dfrac{dy}{dx} + 4y = 8(x^2 + \sin 2x)$

   k. $\dfrac{d^2y}{dx^2} + 4y = \cos 2x + \cos 4x$