

DTL Assignment 1

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Q.1) Solve the following:

(a) $3x(xy - 2)dx + (x^3 + 2y)dy = 0$ [CO 2] [2]

(b) $(2 \cos y + 4x^2)dx - x \sin y dy = 0$ [CO 2] [3]

Q.2) Find a homogeneous linear second order ordinary differential equation whose solution is the set of all straight lines in the xy -plane. [CO 1] [1]

Q.3) State whether the following differential equations are linear or non linear, justify and solve:

(a) $xy' + 2y = \frac{e^{3x}}{x}, x > 0$ with $y(1) = 1 + \frac{e^3}{3}$. [CO 2] [3]

(b) $x^2 y \frac{dy}{dx} - xy^2 = 1$ [CO 2] [3]

Q.4) If x^2 and 1 are solutions of $yy'' - xy' = 0$ then so is any linear combination of these. State true or false and justify. [CO 4] [2]

Q.5) Find a linear ordinary differential equation for which the function $e^{-x} \cos 2x$ and $e^{-x} \sin 2x$ are linearly independent solutions. [CO 2] [3]