

Differential Equations Practice Test #1

SPRING 2004

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Name _____

Instructions. Answers follow this section. Solutions follow the answers.

1. Classify the following according to **order** and **linearity**.

(a) $y''' - 2y'' - 5y' + 6y = 0$

(b) $(y')^3 = y$

(c) $\frac{d^2s}{dt^2} = -9s$

(d) $y'' - 3y' - 10y = 6e^x$

2. Solve: $\frac{dy}{dx} = -\frac{x}{y}$; $y = 2$ when $x = 1$

3. Show that the function $y = c_1e^x + c_2e^{-x} - 4x$ is a solution of the differential equation $y'' - y = 4x$. Given the initial conditions, $y(0) = 2$ and $y'(0) = 0$, obtain a particular solution.

4. Solve: $y' = 8xy + 3y$ $y(-1) = 1$ (Solve as "Linear First Order" ($y' + P(x)y = Q(x)$) AND by Separation of Variables.) (Assume $y > 0$)

5. Solve: $xdy = (2y + 3x) dx$ (Solve as "Linear First Order" ($y' + P(x)y = Q(x)$) AND by Substitution, $v = (\frac{y}{x})$.) (Assume $x, y, > 0$)

6. Solve: $I' + 3I = e^{-2t}$; $I(0) = 5$

7. Solve: $\frac{dI}{dt} + \frac{10I}{2t+5} = 10$; $I(0) = 0$

8. Solve: $y' = \frac{x-y}{x+y}$ (Make no assumptions about x and y)