King Fahd University of Petroleum and Minerals

Quiz 1   Math 202-Semester 131   Duration 25 minutes

Full Name:
ID:

Q 1. Determine the order and state whether the following ODEs are linear or nonlinear (Give a brief justification).

a) $\frac{d^2x}{dt^2} + (1 + \sqrt{x})\frac{dx}{dt} = \sin t$

b) $x\, y''' + (1 - x)y' = e^x$

c) $\frac{d^2u}{dr^2} + \sin(r)\, u\, \frac{du}{dr} = r^2$

d) $y'^2 = \cos y$

Q 2.
a- Verify that $y = \tan(x + C)$ is a one-parameter family of solutions of: $y' = 1 + y^2$.
b- Find a solution of $y' - y^2 = 1$ such that, it is passing through the point $(0, 1)$. Then find the largest interval of definition of the obtained solution.

Q 3. Find an explicit solution and the corresponding interval of definition of the IVP:
$$(\sqrt{x} + x)dy - (\sqrt{y} + y)dx = 0 \quad \text{with} \quad y(0) = 1.$$