KFUPM, DEPARTMENT OF MATHEMATICS AND STATISTICS

MATH 202 : QUIZ 1, SEMESTER (152), FEBRUARY 02, 2016

Name : ....

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Exercise 1. Find all values of m so that the function $y = e^{mx}$ is a solution of the DE :

$$y'' - 12y' + 35y = 0.$$

Exercise 2. Given that $y = \sin[\ln(\frac{x}{1-x}) + c]$; $(c \in \mathbb{R})$ is a one-parameter family of solutions of the DE :

$$(x - x^2)y' = \sqrt{1 - y^2},$$

find two singular solutions of this DE.

Exercise 3.

(a) Find a region R of the xy-plane on which the following IVP :

$$\left[y' = \sqrt{y^2 - 9} + \sqrt{-x^2 + 3x - 2} + \frac{1}{x - (1/2)},\ \ y(x_0) = y_0\right],$$

has a unique solution on an appropriate open interval containing x_0, for all $(x_0, y_0) \in R$.

(b) For $(x_0, y_0) = (\frac{3}{2}, 4)$, find the largest interval on which the solution is defined. What is the largest interval on which the solution may be defined ?.

Exercise 4. Solve the IVP :

$$\left[(x - x^2)y' = 1 + y^2,\ \ y(\frac{1}{2}) = 1\right].$$

What is the largest interval on which the solution is defined ?.