KFUPM **Semester 142**

Dept. Math. & Stat. **A.Y:2014/2015**

Test 1 **Sunday (February 15, 2015)**

Name:…… **ID:……**

Exercise 1:

1. Show that each IVP

$$y'=y^2,\ y(x_0)=y_0$$

has a unique solution on an appropriate interval centered at x_0

2. Find a solution of the IVP in (1) with $y(0)=1$, and determine the largest interval I of definition for the solution.
3. Solve the IVP

$$y'=y^2,\ y(0)=0$$

Solution:

Exercise 2: Solve the following DE:

$$xy' = y^2 - y$$

and show that it has a singular solution.

Find the solution that passes through the indicated points:

(a) (1,1)
(b) (0,0)

Solution:

Exercise 3: Solve the following IVP and find the interval of validity of the solution:

$$(x^2-1)\, y'+2y=(x+1)^2 \ , \ y(2)=5$$

Solution: