KFUPM Term (112) Name_____Serial#_____

MATH 202 Quiz # 1 ID#_____Section_____

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1) (4-points) Verify that
$-2x^2y + y^2 = c$

is a family of implicit solutions of the differential equation
$2xy\,dx + (x^2 - y)\,dy = 0$

2) (3-points) Determine whether the existence and uniqueness theorem guarantees a unique solution of the initial-value problem

$(x^2 + y^2)y' = y^2$ subject to $y(0) = 1$

Give a reason(s) to your answer.

3) (8-points) Solve the initial-value problem

$$(y + 3x + xy + 3)dx + (x^2 + x)dy = 0, \qquad y(2) = 1$$

Then determine a rectangular region on which the solution is valid.