

Last Name:
First Name:

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Quiz n^o 2 (20 minutes)

Show your work and justify your answers. Calculators, notes, cell phones, books are not allowed. Please do not use red or pink ink. Maximum: 20 points

Exercise 1 (3+3 points) .

Classify the following differential equations as separable, linear, exact, or none of these.

Do not attempt to solve the differential equation. Justify your answers.

1. $(y^2 + 1) + (y + 2xy) \frac{dy}{dx} = 0.$

2. $(x^2 + y) + (1 + 2x) \frac{dy}{dx} = 0.$

Exercise 2 (1+4+3+4+2 points) . Consider the initial value problem corresponding to the linear differential equation

$$(x - 1)\frac{dy}{dx} + \frac{2xy}{x + 1} = 1$$

with initial condition $y(0) = 1$.

(a) Write the differential equation in standard form.

(b) Determine the largest interval I where the solution of the initial value problem exists and is unique. *Justify your answer.*

(c) Find an integrating factor for the differential equation.

(d) Find the general solution of the differential equation.

(e) Find the solution of the given initial value problem.