

**Exam Three, MTH 205, Summer 2010**

Ayman Badawi

QUESTION 1. solve  $\frac{dy}{dx} = \frac{1-4x-2y}{2x+y}$

QUESTION 2. solve  $\frac{dy}{dx} = \frac{x^2 e^{(x^3+y^2)}}{y}$

**QUESTION 3.** Solve  $\frac{1}{x}y' + xy = \frac{x}{y^2}$

**QUESTION 4.** solve  $\frac{dy}{dx} = \frac{y^2 + x \ln(y) + x e^{x^2} + 3x}{-2yx - \frac{x^2}{2y} + \frac{\ln(y)}{y} + 10}$

QUESTION 5. Solve  $(2x + 2)y^{(2)} - 2y' = \frac{1}{x}$

**QUESTION 6.** Is there a solution to  $(2x + 2)y^{(2)} - 2y' = 0$ ,  $y(0) = 1$  and  $y'(-1) = 1$ ? If yes, find the solution. If not, does that contradict some of the results we studied? Explain.

**QUESTION 7.** A tank with capacity 20 liters contains 10 liters of water in which 20 grams of salt is dissolved. A mixture containing 1 gram of salt per liter is pumped into the tank at a rate 4 liters/min, the well-mixture solution is pumped out at rate 3 liters/min. Find the amount  $A(t)$  of salt in the tank at time  $t$ . What will be the amount of salt in the tank at the instant it overflows?

### Faculty information

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