

QUIZ 3 - MATH 310

Thursday, September 12

YOUR NAME: _____

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Read each problem **very carefully** before starting to solve it and do only what is asked. Each problem is worth around 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. [6 points] A tank is partially filled with 100 liters of water in which 15 kg of salt are dissolved. Then at time $t=0$, pure water enters the tank at a rate of 10 liters/minute and the mixed solution is drained off at a rate of 8 liters/minute. Find the number of kg of salt in the tank at time t (before the tank overflows).

2. [6 points] Consider the differential equation

$$(2x^3 - 3x^2y + y^3)\frac{dy}{dx} = 2x^3 - 6x^2y + 3xy^2.$$

(a) Write in the standard form and check whether it is exact.

(b) If it is exact, solve it. You may leave your answer in implicit form.