Math 242,   Exam 2,   Fall, 2023

You should KEEP this piece of paper. Write everything on the **blank paper provided**. Return the problems **in order** (use as much paper as necessary), use **only one side** of each piece of paper. Number your pages and write your name on each page. Take a picture of your exam (for your records) just before you turn the exam in. I will e-mail your grade and my comments to you. I will keep your exam. **Fold your exam in half** before you turn it in.

The exam is worth 50 points. Each problem is worth 10 points. **Make your work coherent, complete, and correct.** Please $\boxed{CIRCLE}$ your answer. Please **CHECK** your answer whenever possible.

The solutions will be posted later today.

No Calculators, Cell phones, computers, notes, etc.

(1) Solve $x\frac{dy}{dx} + 6y = 3xy^{4/3}$.

(2) Solve the Initial Value Problem

$$\frac{dy}{dx} = -6xy, \quad y(0) = 7.$$

(3) Solve the Initial Value problem

$$\frac{dx}{dt} = 3 - x, \quad x(0) = x_0.$$

Graph the solution of the Initial Value Problem for a few different choices of x_0.

(4) Find the general solution of $y^{(4)} - 8y^{(3)} + 16y'' = 0$. (In this problem, y is a function of x.)

(5) Find the general solution of $y'' + 4y = 3x^3$. (In this problem, y is a function of x.)