Math 242,   Exam 3,   Spring, 2018

Write everything on the blank paper provided. **You should KEEP this piece of paper.** If possible: return the problems in order (use as much paper as necessary), use only one side of each piece of paper, and leave 1 square inch in the upper left hand corner for the staple. If you forget some of these requests, don't worry about it – I will still grade your exam.

The exam is worth 50 points. Each problem is worth 10 points. Please 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. The exam will be returned in class on Thursday.

No Calculators or Cell phones.

(1) Suppose that a car starts from rest, its engine providing an acceleration of 10 ft/sec, while air resistance provides $1/10$ ft/sec^2 of deceleration for each foot per second of the car's velocity. Find the car's maximum possible (that is, limiting) velocity.

(2) Solve $4y''' + 12y'' + 9y' = 0$.

(3) Solve the Initial Value problem $y'' + 9y = \cos 2x$, $y(0) = 1$, $y'(0) = 0$.

(4) Solve $y' + \frac{4}{x}y = x^3 y^2$.

(5) Solve the Initial Value Problem $\frac{dx}{dt} = x^2 - 5x + 4$, $x(0) = x_0$.