Name:_____

Recitation:_____

Math 240
Exam 1
Sept. 23, 2014

Problem	Score
1	
2	
3	
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5	
6	
7	
8	
Total	

Closed book. You may use a calculator and one 8 ½ × 11" sheet of handwritten notes (both sides). You must show your work to receive full credit. Please do all work on the test pages. The last page is intentionally left blank in case you need extra room.

Pledge:
On my honor, as a student, I have neither given nor received unauthorized aid on this

examination: _____ _____

(signature) (date)

Name:_____

1. Find all solutions to $\frac{dy}{dx} = 2x(y^2 - 1)$.

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2. Find all solutions to $\frac{dy}{dx} = xy^2 - 2y$.

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3. Solve the initial value problem $\frac{dy}{dx} = \frac{3x^2 - 2y}{2x + 5}$, $y(1) = 1$.

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4. Solve the initial value problem, $\frac{dy}{dx} = \cos(x) - 3x^2 y, \quad y(0) = 1.$ Your answer will include an integral that you can't simplify.

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5. Solve the initial value problem, $\frac{dy}{dx} = \frac{x}{2y} - \frac{y}{2x}$, $y(1) = 1/3$.

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6. Suppose $P(t)$ is the solution to the initial value problem
$\frac{dP}{dt} = -(P-4)(P-2)(P+3)$, $P(0) = P_0$.

a) For what values of P_0 is $\lim_{t\to\infty} P(t)$ defined and positive?

b) For what values of P_0 is $\lim_{t\to-\infty} P(t)$ defined and positive?

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7. Using the improved Euler method with step size $h = 1/2$, approximate $y(1/2)$ if $\frac{dy}{dx} = 2x - y$, $y(0) = 1$.

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8. Find values for a and b so that the solution to the initial value problem $\frac{dy}{dx} = x^2 - y^2 + a$, $y(-4) = b$, is a straight line.

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