MAT 1330, Fall 2011 Assignment 7

Due Friday December 2nd at 3:00pm in math department (585 King Edward ave) foyer.

Late assignments will **not** be accepted; **nor** will unstapled assignments.

Instructor (circle one): Robert Smith? Jason Levy Olga Vassilieva Catalin Rada

DGD (circle one): 1 2 3 4

Student Name _____ Student Number _____

By signing below, you declare that this work was your own and that you have not copied from any other individual or other source.

Signature _____

QUESTION 1.

Use the Newton's method to estimate the solution of the equation

$$2\cos(x) - x = 0.$$

by completing the following steps:

(a) Use the Intermediate Value Theorem to show that there exists a solution between 0 and $\frac{\pi}{2}$:

(b) Perform four iterations of the Newton's method with the initial value $x_0 = \frac{\pi}{4}$ (use 8 decimal places).

n	x_n	x_{n+1}
0		
1		
2		
3		

QUESTION 2. Suppose that the length of a snake at age t is given by the function $L(t)$, which satisfies the following equation:

$$\frac{dL}{dt} = e^{-0.1t}, \quad t \geq 0.$$

(a) Find $L(t)$ if the limiting length L_∞ is given by

$$L_\infty = \lim_{t\to\infty} L(t) = 25 \text{ (inches)}.$$

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(b) How long was the snake at age $t = 0$?

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QUESTION 3.

Evaluate the following integrals.

(a) $\int x \ln x dx$

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(b) $\int \frac{dx}{x \ln x}$

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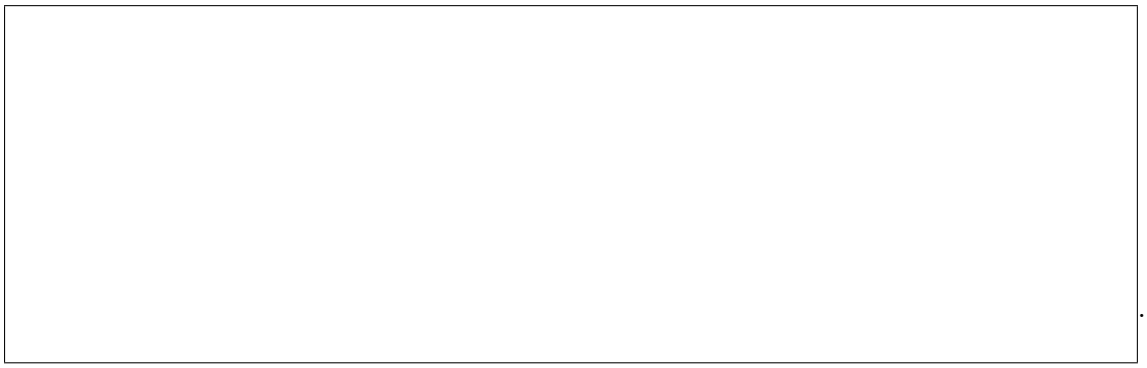
(c) $\int e^{2x} \cos(3x)\ dx$

(d) $\int x\sqrt{2x-1}\ dx$



(e) $\int 3x^2\cos(x^3)\ dx$

(f) $\int te^{t^2+1}\ dt$

.

(g) $\int e^{\cos x} \sin x \; dx$

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