Study Guide 2

MATH 140 Lab: Section 1

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Student's Name:----------

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Note: *This study guide contains my practice questions that I think will be useful for preparing you for the second exam in Calculus for Life Scientists.*

Question 1: Find the derivative for the following:
Hint: Use Implicit Differentiation to find y'

$$e^y + xy^3 = 5x$$

Question 2: Find the equation of the tangent line at the point $(0, \pi)$ to the following curve:

$$x^2 \cos^2 y - \sin y = -x$$

Question 3: Determine the values of x for which the function:

$$y = x^5 - 20x^2 + 1$$

is decreasing/increasing and determine concavity of the function. Find the location of maxima/minima and inflection points. Sketch the curve.

Question 4: Find the absolute extrema of the given function on $[-3,2]$.

$$f(x) = x^3 - 3x + 1$$

Question 5: Given a function:

$$f(x) = e^{-\frac{x^2}{2}}$$

Determine the intervals where the graph of f is concave up and concave down, then find the inflection points.

Question 6: Find the integral for the following:

a. $\int \frac{4x}{x^2+3}\,dx$

b. $\int (3e^x - 2)dx$

c. $\int \frac{x^{\frac{1}{3}}-3}{x^{\frac{2}{3}}}\,dx$

d. $\int 2\sec x \tan x\,dx$

Question 7: Evaluate the integral:

$$\int x^{-3}\left(\sqrt[3]{x} - 3x^{-1} + 3\right)dx$$

Question 8: Evaluate the integral:

$$\int \frac{x^3}{\sqrt{1-x^4}}dx$$

Question 9: Find the following integral:

$$\int \left(\frac{8x+2}{x}\right)^2 dx$$

Question 10: A rectangular plot of farmland will be bounded from one side by a river and from the other three sides by a fence. With a $2600\ ft$ of the wire at your disposal. What is the largest area you can enclose?

Good Luck in Exam 2
Mohammed Kaabar