PRINCE SULTAN UNIVERSITY

MATH 111 CALCULUS 1

MAJOR EXAM 3 28th MAY 2011

Start: 9:00 a.m.
End: 9:50 a.m.

Name: _____

I.D.: _____ **Instructor:** _____

1. Answer all questions
2. This exam consists of 1 Cover Sheet & 3 Question Sheets with 10 questions.
3. You can use a calculator, **NOT** a mobile phone.
4. No talking during the test.
5. Show all working out in the space provided.

Question No.	Max. Points	Points Scored
1,2,3,4	24	
5,6,7,8,9	30	
10	12	
TOTAL	66	

1) [6 points] Given that $y = \ln\sqrt{\dfrac{x^2-1}{x^2+1}}$ find an equation for the tangent line to the graph at $x = 3$.

2) [6 points] Given that $3y - x^2 + \ln xy = 2$, show that $y' = \dfrac{y\left(2x^2-1\right)}{x\left(3y+1\right)}$

3) [6 points] Find the *x* coordinate of the point(s), if any, at which the tangent line to the graph of $f(x) = \ln\left[\sqrt{6x-1}\left(4x+5\right)^3\right]$ is horizontal.

4) [6 points] Given $y = \dfrac{\left(x^2+3\right)^5}{\sqrt{x+1}}$ find y' using logarithmic differentiation.

5) [6 points] Given that $y = \left(e^{4x} - 5^{\cos 2x}\right)^3$, find y'

6) [6 points] Given that $y = \ln\left[\cos e^{-x}\right]$, find y'. **Simplify your answer as much as possible.**

7) [6 points] Given that $e^{xy} - x^3 + 3y^2 = 11$, use implicit differentiation to find y'

8) [6 points] Given that $y = \sqrt{\tan^{-1} e^{2x}}$, find y'

9) [6 points] Given that $y = \sqrt{x}\sec^{-1}\sqrt{x}$, find y'. **Simplify your answer as much as possible.**

10) [12 points] Given that $f(x)=x^4-6x^2+5$, graph $f(x)$ by using the end behaviour, multiplicity, intercepts, first and second derivatives. Label the coordinates of the intercepts, stationary points and inflection points.