Ms. Nguyen Calculus 101A
Sample Test Chapter 2

1. Find an equation for the tangent line to the graph of $f(x)=\sqrt{2x+1}$ at (4,3).

2. Differentiate the functions given below.

a) $g(x)=\dfrac{5x^5+4x^3-8x^2+6x+1}{3x^2+1}$

b) $f(t)=2^{3x}\ln t+e^{2t}\sec t$

c) $h(x)=\ln(\cos 4x)+2\tan^{-1}(3x)$

d) $k(x)=\sin^2 4x-2\tan^3 2x$

e) $y=(\sin x)^x$

f) $y=\ln\left(\dfrac{x^3\sqrt{3x-2}}{5x-1}\right)$

g) $h(x)=\sec 5x+\cos^{-1}5x$

3. Find $\dfrac{dy}{dx}$ by implicit differentiation: $\cos(x+y)-\sin(x-y)$

4. Decide whether Rolle's Theorem can be applied to $f(x)=x^4-4x^3+4x^2+1$ on the interval [-1, 3]. If Rolle's Theorem can be applied, find all value(s), *c*, in the interval such that $f'(c)=0$. If Rolle's Theorem cannot be applied, state why.

5. Decide whether the Mean Value Theorem applied to the given function on the given interval. If it does, find all possible values of *c*; if not, state the reason.

a) $f(x)=x^2+3x-1$ on [-3,1]

b) $f(x)=\dfrac{x-4}{x-3}$ on [0,4]

6. Show that $f(x)=2x^3-9x^2+1$ has exactly one solution on the interval (4,5).

7. The position equation for the movement of the particle is given by $s(t)=(t^3+1)^2$ where $s$ is measured in feet and $t$ is measured in seconds. Find the acceleration of this particle at 1 second.

8. Show that if $f(x)=mx^2+nx+p$ with $m\neq 0$, then the number *c* of the Mean Value Theorem is always the midpoint of the given interval [*a, b*].