M E T U
Northern Cyprus Campus

	Calculus with Analytic Geometry Short Exam 1	
Code : *Math 119* Acad.Year: *2014-2015* Semester : *Summer* Date : *10.07.2015* Time : *13:10* Duration : *20 minutes*	Last Name: Name: KEY Signature:	List No: Student No:
	3 QUESTIONS 2 PAGES TOTAL 20 POINTS	

1(8)	2(8)	3(4)			

Show your work! No calculators! Please draw a $\boxed{\text{box}}$ around your answers!
Please do not write on your desk!

1. ($2 \times 4 = 8$ pts.) Evaluate the limit, if it exists. **Give reasoning.**

DO NOT USE L'HOSPITAL'S RULE.

(a) $\lim\limits_{x\to-2} \dfrac{x+2}{|x^2+4|}$ $= \dfrac{\lim\limits_{x\to-2} x+2}{\lim\limits_{x\to-2} |x^2+4|} = \dfrac{0}{8} = 0$

$\lim\limits_{x\to-2} |x^2+4| = 8 \neq 0$

(b) $\lim\limits_{x\to-1} \dfrac{x^3+1}{(x+1)(x-2)}$ $= \lim\limits_{\substack{x\to-1 \\ (x\neq-1)}} \dfrac{\cancel{(x+1)}(x^2-x+1)}{\cancel{(x+1)}(x-2)} = \dfrac{+3}{-3} = -1$

2. ($2 \times 4 = 8$ pts.) Find the following derivatives.

DO NOT SIMPLIFY YOUR ANSWERS.

(a) $\frac{d}{dx}\left(\sec(\sin x)\right) = \frac{d}{du}\sec(u) \cdot \frac{du}{dx} = \sec u \tan u \cdot \frac{du}{dx}$

$u = \sin x$

$\frac{du}{dx} = \cos x$

$= \boxed{\sec(\sin x)\tan(\sin x)\cos x}$

(b) $\frac{d}{dx}\left(\frac{x\cos(x)}{x^2+1}\right) = \frac{(\cos x - x\sin x)(x^2+1) - (x\cos x)\cdot 2x}{(x^2+1)^2}$

3. ($4 \times 1 = 4$ pts.) Determine whether the given statement is true or false.
Indicate your answers by typing **TRUE** or **FALSE** in the blank space provided before the statement. No explanations required.

(a) FALSE An equation of the tangent line to the curve $f(x) = x^3 + 5x + 1$ at the point $(0, 1)$ is $y = (3x^2 + 5)(x) - 1$.

(b) TRUE Let $f(x) = x^2 + x + 1$. Then there exists a number $\delta > 0$ such that if $0 < |x - 1| < \delta$ then $|f(x) - 3| < \frac{1}{2}$.

(c) TRUE If f is continuous at 2 and $f(2) = -1$, then $\lim_{x\to 1} f(3x^2 - 1) = -1$.

(d) FALSE If $\lim_{x\to a} f(x)g(x)$ exists, then $\lim_{x\to a} f(x)$ and $\lim_{x\to a} g(x)$ exist, and $\lim_{x\to a} f(x)g(x) = \lim_{x\to a} f(x) \lim_{x\to a} g(x)$.