NAME: _____

STUDENT ID: _____

DAWSON COLLEGE - DEPARTMENT OF MATHEMATICS
FINAL EXAMINATION
Calculus I - 201-NYA-05 Section: 03-001
Instructor: O.Veres   May 14, 2012 (6:30 p.m. - 9:30p.m.)

(MARKS)

(16)   **1. Evaluate the following limits.**

(a) $\lim\limits_{x \to \infty} \dfrac{2x^4 - 3x - 2}{4x^4 + x^2 - 5x + 1}$

(b) $\lim\limits_{x \to 1} \dfrac{\sqrt{x+3} - 2}{1 - x}$

(c) $\lim\limits_{x \to 0} \dfrac{x^2 - \cos x + 1}{2 \sin x - x + 1 - e^x}$

(d) $\lim\limits_{x \to 2} \dfrac{3x^2 - 6x}{|x-2|}$

(6)   **2. Given** $f(x) = \begin{cases} k^2 x^2 - kx & \text{if } x \quad 3 \\ \\ kx - 1 & \text{if } x > 3 \end{cases}$

Find all values of k such that f is continuous at $x = 3$. Justify your answer using the definition of continuity.

(6)   **3. (a) Using only the definition of derivative, find $f'(x)$ for $f(x) = \dfrac{3}{x+1}$**

(b) Check your answer using the derivative rules.

(6)   **4. If $y = f(x)$ satisfies the equation $y^3 - 2y^2 + 3xy = 5$**

(a) Using implicit di erentiation find y' at the point $P(2 \ 1)$.

(b) Find an equation of the tangent line to the graph of $y = f(x)$ at $P(2 \ 1)$.

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(16)   5. Differentiate each function.

(a) $f(x) =$

ANSWERS:

1 **(a)** [1]