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**DAWSON COLLEGE
MATHEMATICS DEPARTMENT**

FINAL EXAMINATION

201-NYA-05 CALCULUS I – SCIENCE

THURSDAY DECEMBER 20th 2018

(1) **(4+4+4 marks)** Find the limit, if it exists. If the limit does not exist explain why.

Do not use L'Hôpital's Rule.

(a) $\lim_{x \rightarrow \infty} \frac{x^2 + 1}{x^2}$

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(5) (3 marks) Find the values of c where the functions $f(x) = x$ and $g(x) = 2x - 2x^2$ have parallel tangent lines at $x = c$.

(6) (4+4+4+4 marks) Find $f'(x)$ if: (Do not simplify your answers)

(a) $f(x) = \tan(\cos x) + e^{10} + g_4(3x + 5)$

(b) $f(x) = \left(\frac{4^2 \cdot 2x}{x^5 \cdot 2^3 + 1} \right)^{10}$

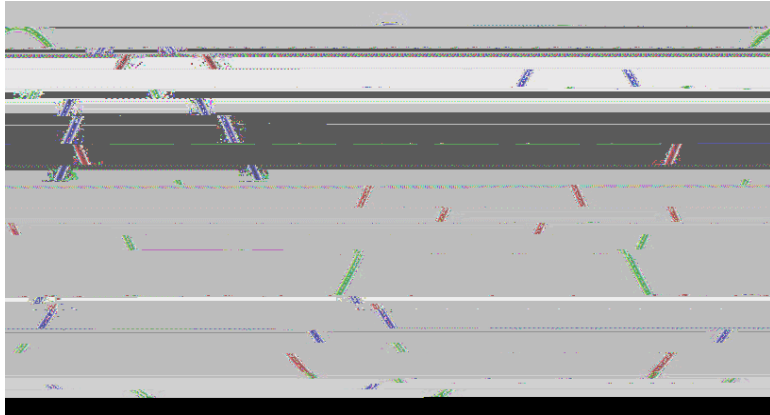
(c) $f(x) = \sqrt{!^2} \arcsin(5)$

(d) $f(x) = \cos(2x)^x$

(7) (4 marks) If $f(x) = \sin(x)$

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(14) (4+4 marks) Find:

(a) $\left(\frac{2}{3x^2} \right)^5 + 5e^x + 4\sec^2$ %
&

(b)

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