Name: JANN LAMONTAGNE
Student ID: _____

Quiz 1

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. pg.653#42 *(4 marks)* Evaluate the following limit.

$$\lim_{x\to\infty} \frac{1-2x^2}{(4x+3)^2} = \lim_{x\to\infty} \frac{1-2x^2}{16x^2+24x+9}$$

$$= \lim_{x\to\infty} \frac{(1-2x^2)\left(\frac{1}{x^2}\right)}{(16x^2+24x+9)\left(\frac{1}{x^2}\right)}$$

$$= \lim_{x\to\infty} \frac{\frac{1}{x^2}-\frac{2x^2}{x^2}}{\frac{16x^2}{x^2}+\frac{24x}{x^2}+\frac{9}{x^2}}$$

$$= \lim_{x\to\infty} \frac{\frac{1}{x^2}-2}{16+\frac{24}{x}+\frac{9}{x^2}} = \frac{0-2}{16+0+0} = \frac{-1}{8}$$

Question 2. pg.657#9 *(6 marks)* Calculate the slope of the tangent line of the function $y = 2x^2 + 5x$ at the point $(-2,-2)$. *Bonus. (1 mark) write the equation of the tangent line*

Let $f(x) = 2x^2+5x$

$m_{tan} = f'(-2)$

$$f'(x) = \lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$$

$$= \lim_{h\to 0} \frac{2(x+h)^2+5(x+h)-[2x^2+5x]}{h}$$

$$= \lim_{h\to 0} \frac{2(x^2+2xh+h^2)+5x+5h-2x^2-5x}{h}$$

$$= \lim_{h\to 0} \frac{2x^2+4xh+2h^2+5x+5h-2x^2-5x}{h}$$

$$= \lim_{h\to 0} \frac{h(4x+2h+5)}{h} = 4x+5$$

$m_{tan} = f'(-2) = 4(-2)+5 = -3$

Bonus: $y = mx+b$
$y = -3x+b$

$-2 = -3(-2)+b$
$-8 = b$

$\therefore y = -3x-8$