CALCULUS MA-1001 MIDTERM 1

Name: _____ **Department:** _____ **ID:** _____

(1) (20ps) For what values of b and c is the function

$$g(x) = \begin{cases} \frac{x-b}{b+1} & x > 0 \\ c & x = 0 \\ x^2 + 4b^2 & x < 0 \end{cases}$$

continuous at $x = 0$?

In what follows, you can only use what you learned up to chapter two to find the following limits , i.e. no l'Hôpital's rule (if you know what that is).

(2) (15ps) $\lim_{x \to 1} \frac{\sqrt{x+3} - 2}{x - 1}$.

(3) (15ps) $\lim_{x \to 0} \frac{x^2}{1 - cos(2x)}$.

(4) (15ps) $\lim_{x\to 1} \dfrac{x^{\frac{2}{3}}-1}{x^{\frac{1}{3}}-1}$. Hint: $y^3-1=(y-1)(y^2+y+1)$.

(5) (10ps) $\lim_{x\to -2^-} (x+3)\dfrac{|x+2|}{x+2}$.

(6) (20ps) $\lim_{x\to -\infty} -2x-\sqrt{4x^2+7x-4}$.

(7) (5ps) $\lim_{x\to -5^-} \dfrac{-3x}{2x+10}$. (For this problem, there is no need to say why).