MAT 1308 A Assignment 2 (Due TUE. MARCH 1st, 17:30) **Student Number:**

NAME:

Problem 1: For what values of c and d is the following function continuous?

$$f(x) = \begin{cases} c\sqrt{2-x} & \text{if } x \leq -1, \\ 3x & \text{if } -1 < x < 1, \\ (x+d)^2 & \text{if } x \geq 1. \end{cases}$$

Problem 2: Find the following limits:

A. $\lim_{x \to 2} \dfrac{|x-2|}{x^2-4}$.

B. $\lim_{x \to 3} \dfrac{2}{x^2-9}$.

C. $\lim_{x \to 3} \dfrac{\sqrt{x+6}-3}{x-3}$.

D. $\lim_{x \to \infty} \dfrac{3x}{1-6x^2}$.

E. $\lim_{x \to \infty} \dfrac{2x^2}{x^2-9}$.

F. $\lim_{x \to \infty} e^x$.

G. $\lim_{x \to 1} \dfrac{x-1}{x^2+4x-5}$.

H. $\lim_{x \to 0} \dfrac{(x+1)^{\frac{1}{4}}-1}{x}$.

Problem 3: Using the definition of the derivative find the derivatives of the following functions:

$$a) f(x) = \frac{1}{x+1} \qquad b) g(x) = (x+2)^2 \qquad c) u(x) = \sqrt{x^2+1}$$

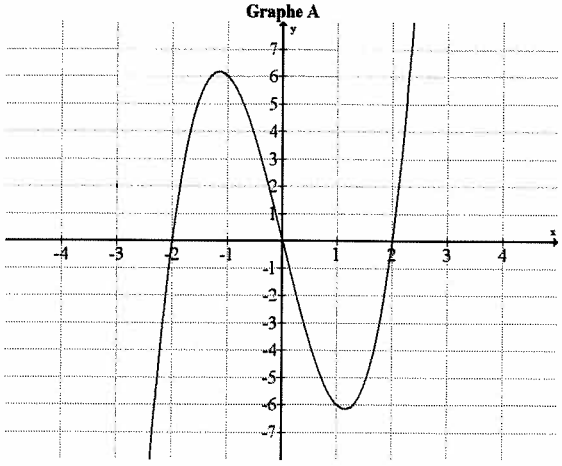
Problem 4: Find the derivatives of the following functions:

1. $s(x) = \dfrac{x}{x^2+1}$.
2. $f(x) = \sqrt{\dfrac{3x+9}{x^2+1}}$.
3. $g(x) = x^3(x^2+3x+5)^{11}$.
4. $k(x) = \sqrt{x+1}(x^2+4x+2)$
5. $h(x) = \dfrac{x+1}{\sqrt{x}(x-2)}$
6. $u(x) = (x^2 + x^{\frac{1}{2}} + 5)^{\frac{3}{2}}$

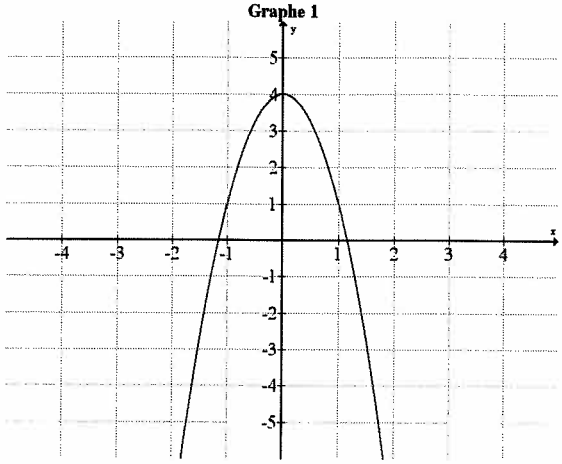
Problem 5: Match the functions on the left with their derivatives:

Function	Derivative
Graph A	
Graph B	
Graph C	
Graph D	

Graphe A



Graphe 1



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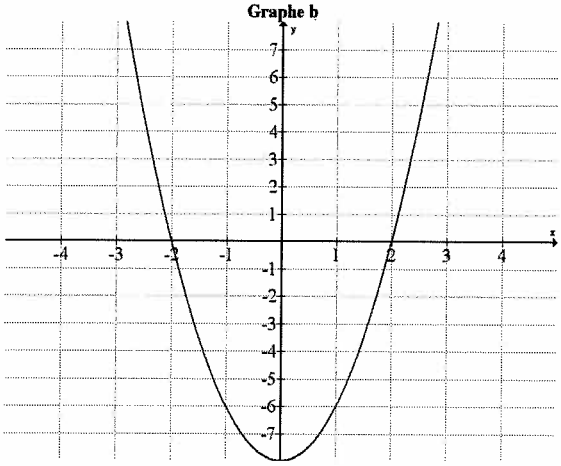
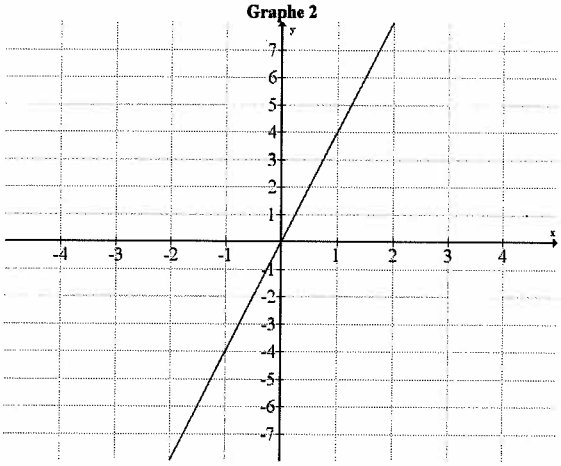


Graphe 2



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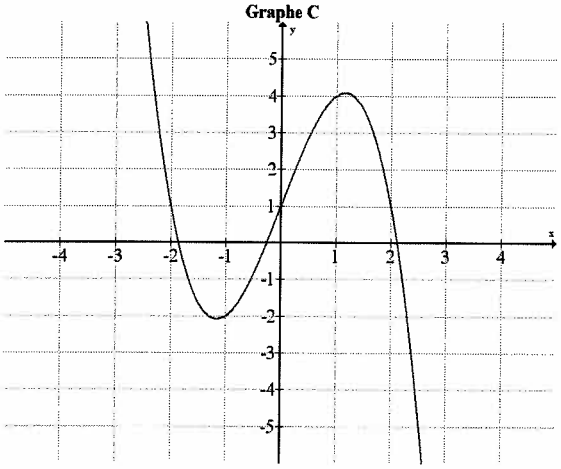

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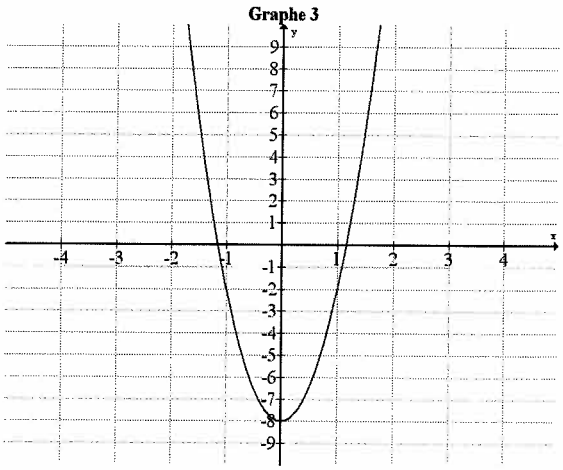
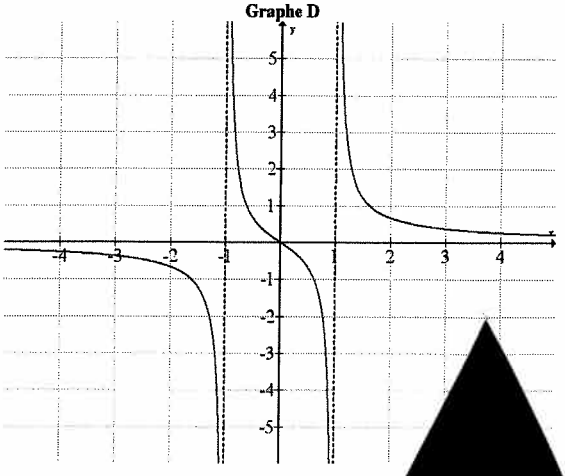


Graphe D



Graphe 4