Applications of the Derivatives to the variations of functions

[use one full page per function to answer. See model on next page].

For each of the following functions :

1. Give the set of definition, D_f, in the form of intervals (open or closed).
2. Calculate the Derivative by using the general formulas
3. Solve the equation $f'(x) = 0$.
4. Study the sign of the derivative on the intervals of D_f.
5. Chart the sign of $f'(x)$ on D_f and give the variations of f accordingly.
6. Find the values of Maximum and minimum if any (show value in chart).
7. Find the coordinates of the interception with the axis (Ox)
8. Find the coordinates of the interception with the axis (Oy).
9. Write the equation of the tangent line to the interception with (Oy)
10. Sketch the curve of the function very carefully.

You may check your answers on a computer or a graphic calculator, but you must draw the curve yourself.

$$f_1(x) = \frac{1}{6}x^3 + \frac{1}{4}x^2 - 3x + 2$$

$$f_2(x) = x^4 - 4x^2 + 1$$

$$f_3(x) = \frac{2x^2 + 8x + 1}{x(x+4)}$$

$$f_4(x) = \frac{x^2 + 2x + 3}{x^2 - 2x - 3}$$

$$f_5(x) = \frac{x}{1 - x^2}$$

$$f_6(x) = \frac{(x+1)^2}{x^2 - x - 6}$$

$f(x) =$

1. *Set of definition : D =*

2. *Derivative f '(x) =*

3. *Zeroes of the derivative :*

4. *Sign of the derivative :*

5. *Chart :*

x	$-\infty$ $+\infty$
Sign [f '(x)]	
Variations of f