

Please use scrap paper, or back of the page, before copying your answers in the spaces below.

$$f(x) = \frac{2x^2 - x^3}{2(x+1)^2}$$

Problem I :

1. Break  $f(x)$  into the **form**  $ax + b + \frac{cx + d}{2(x+1)^2}$  ( $x \neq -1$ )..... 4 pts
2. Find the **limits** of  $f$  at the ends of each interval of its definition set ..... 4 pts  
[Use back of page to justify answers]
3. Show that  $(C_f)$  has a “vertical” and an **oblique asymptote** ( $\Delta$ ), give their equations..... 4 pts
4. Justify the **position** of  $(C_f)$  with respect to the asymptote ( $\Delta$ ). ..... 2 pts
5. Find the derivative  $f'(x)$  and **factor** it in binomials..... 6 pts
6. Give the **zeroes** of  $f'(x)$  and justify the **signs** of the derivative. .... 6 pts
7. Find the Ox and Oy - **intercepts** of  $(C_f)$  ..... 4 pts
8. Find the **intersection** of  $(C_f)$  with its asymptote ( $\Delta$ ). ..... 2 pts
9. Find the equation of the **tangent** line in  $A(2;0)$  to  $(C_f)$  ..... 2 pts

10. Show all the previous results in the **chart** below. .... 6 pts

$x$	$-\infty$	$+\infty$
<i>Sign</i> $[f'(x)]$		
Variations and <i>limits</i> of $f$		

11. Give the approximate decimal value of the **extremes** : ..... 2 pts

12. Draw carefully ( $C_f$ ) its **asymptotes**, and the **tangent** line ( $T_A$ ). ..... 8 pts

