

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

Problem I :

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

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** (Δ), give their equations..... 4 pts
4. Justify the **position** of (C_f) with respect to the **asymptote** (Δ). 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 (Δ). 2 pts
9. Find the equation of the **tangent** line (T_A) 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 **extrema**:..... 2 pts

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

