

Sujet A

Corrigé / 1,5

notation incohérente: (-1)

(Ex1)  $f(x) = 2x^3 - 3x^2 - 12x + 3$  sur  $[-4; 4]$

a)  $f'(x) = 6x^2 - 6x - 12$  1,5

b)  $\Delta = (-6)^2 - 4 \times 6 \times (-12) = 324 > 0$  2 racines  $x_1 = \frac{-(-6) - \sqrt{324}}{2 \times 6} = -1$   
 $x_2 = \frac{-(-6) + \sqrt{324}}{2 \times 6} = 2$

|         |      |    |    |     |   |    |               |
|---------|------|----|----|-----|---|----|---------------|
| $x$     | -4   | -1 | 2  | 4   |   |    |               |
| $f'(x)$ |      | +  | 0  | -   | 0 | +  | $a=6 > 0$ 0,5 |
| $f(x)$  |      |    | 10 |     |   | 35 |               |
|         | -125 |    |    | -17 |   |    | 1,5           |

(Ex2)

$f(x) = \sqrt{4x^2 + x + 2}$

$(\sqrt{u})' = \frac{u'}{2\sqrt{u}}$

$f'(x) = \frac{8x + 1}{2\sqrt{4x^2 + x + 2}}$  2,5

$g(x) = \frac{3x+2}{x^2+4}$

$(\frac{u}{v})' = \frac{u'v - uv'}{v^2}$

$g'(x) = \frac{3(x^2+4) - 2x(3x+2)}{(x^2+4)^2}$

$= \frac{3x^2 + 12 - 6x^2 - 4x}{(x^2+4)^2}$

$= \frac{-3x^2 - 4x + 12}{(x^2+4)^2}$  3

$h(x) = e^{-2x^2+3}$

$h'(x) = -4xe^{-2x^2+3}$  2,5

$(e^u)' = u'e^u$

$p(x) = (5x-1)^3$

$(u^n)' = nu^{n-1}u'$

$p'(x) = 3 \times 5 \times (5x-1)^2 = 15(5x-1)^2$  2,5

$m(x) = (3-x)e^x$

$m'(x) = -1 \times e^x + (3-x)e^x$   
 $= e^x(-1 + 3 - x)$   
 $= e^x(2-x)$  3

$(uv)' = u'v + uv'$

Sujet B

6,5 / 1,5

notations incohérentes (-)

Ex 1)  $f(x) = 2x^3 + 3x^2 - 12x + 3$  sur  $[-4; 4]$

a)  $f'(x) = 6x^2 + 6x - 12$  1,5

b)  $\Delta = 6^2 - 4 \times 6 \times (-12) = 324 > 0$  2 racines  $x_1 = \frac{-6 - \sqrt{324}}{2 \times 6} = -2$

$x_2 = \frac{-6 + \sqrt{324}}{2 \times 6} = 1$

|         |     |    |    |     |   |
|---------|-----|----|----|-----|---|
| $x$     | -4  | -2 | 1  | 4   |   |
| $f'(x)$ | +   | 0  | -  | 0   | + |
| $f(x)$  | -29 | 23 | -4 | 131 |   |

$a = 6 > 0$  0,5

Ex 2)  $f(x) = e^{3x^2+3}$

$(e^u)' = u' e^u$

$f'(x) = 6x e^{3x^2+3}$  2,5

$g(x) = (3x-1)^4$  13,5

$(u^n)' = n u' u^{n-1}$

$g'(x) = 4 \times 3 \times (3x-1)^3 = 12(3x-1)^3$  2,5

$p(x) = \frac{x-5}{x^2+2}$

$(\frac{u}{v})' = \frac{u'v - uv'}{v^2}$

$p'(x) = \frac{1 \times (x^2+2) - (x-5) \times 2x}{(x^2+2)^2}$   
 $= \frac{x^2+2 - 2x^2 + 10x}{(x^2+2)^2}$   
 $= \frac{-x^2 + 10x + 2}{(x^2+2)^2}$  3

$h(x) = (8+x)e^x$   
 $(uv)' = u'v + uv'$

$h'(x) = 1xe^x + (8+x)e^x$   
 $= e^x(1+8+x)$   
 $= e^x(x+9)$  3

$m(x) = \sqrt{3x^2+2x+12}$

$(\sqrt{u})' = \frac{u'}{2\sqrt{u}}$

$m'(x) = \frac{6x+2}{2\sqrt{3x^2+2x+12}}$  2,5

$= \frac{3x+1}{\sqrt{3x^2+2x+12}}$