Devoir n° 4

① $f_1(x) = 7x^3 - 3x^2 + 3x - 3$

$f_1'(x) = 21x^2 - 6x + 3$

② $f_2(x) = \sqrt{x^2 - 5x + 7}$

$f_2'(x) = \dfrac{2x-5}{2\sqrt{x^2-5x+7}}$ en vertu de la formule $(\sqrt{u})' = \dfrac{u'}{2\sqrt{u}}$

③ $f_3(x) = (3x-2)\sqrt{4x+7}$

$f_3'(x) = (3x-2)'\sqrt{4x+7} + (3x-2)(\sqrt{4x+7})'$

$= 3\sqrt{4x+7} + (3x-2)\dfrac{4}{2\sqrt{4x+7}}$

$= 3\sqrt{4x+7} + \dfrac{2(3x-2)}{\sqrt{4x+7}}$

④ $f_4(x) = \dfrac{3x-4}{4x^3 - x}$

$f_4'(x) = \dfrac{(4x^3-x)\cdot 3 - (12x^2-1)(3x-4)}{(4x^3-x)^2}$

⑤ $f_5(x) = (2x-3)(7x^2+x)$

$f_5'(x) = 2(7x^2+x) + (14x+1)(2x-3)$

$$f_6(x) = \frac{5}{(x^2+9)^4}$$

$$= 5(x^2+9)^{-4}$$

alors $f_6'(x) = 5(-4)\,2x\,(x^2+9)^{-5}$ en vertu de la formule $(u^n)' = n u' u^{n-1}$

donc $$\boxed{f_6'(x) = \frac{-40x}{(x^2+9)^5}}$$

$$f_7(x) = (3x^2+1)^3$$

alors $f_7'(x) = 3 \cdot 6x\,(3x^2+1)^2$

$$= 18x\,(3x^2+1)^2$$

$$f_8(x) = \frac{1}{x}(3x^2+4)^3$$

alors $f_8'(x) = \left(\frac{1}{x}\right)'(3x^2+4)^3 + \frac{1}{x}\left((3x^2+4)^3\right)'$

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

$$= -\frac{1}{x^2}(3x^2+4)^3 + 18(3x^2+4)^2$$

$$f_9(x) = \left(\frac{7x-5}{x^4+2}\right)^3$$

alors $$f_9'(x) = 3\left(\frac{7x-5}{x^4+2}\right)^2 \frac{(x^2+2)7 - 4x^3(7x-5)}{(x^4+2)^2}$$

$$f_{10}(x) = \frac{3x-4}{\sqrt{x^2-x}}$$

alors $$f_{10}'(x) = \frac{3\sqrt{x^2-x} - (3x-4)\cdot\frac{2x-1}{2\sqrt{x^2-x}}}{x^2-x}$$