<u>Exple</u> $f(x) = \dfrac{1}{x^2+3}$ $u = 1$ $v = x^2+3$

$u' = 0$ $v' = 2x$

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

$$f'(x) = \frac{0\cdot(x^2+3) - 1\cdot 2x}{(x^2+3)^2} = -\frac{2x}{(x^2+3)^2}$$

$$\Rightarrow \boxed{\left(\frac{1}{v}\right)' = -\frac{v'}{v^2}}$$

<u>Ex 2.7.18</u>

g) $f(x) = \dfrac{5}{(2x^2-1)}$ $v = 2x^2-1$

$v' = 4x$

$$f'(x) = 5\left(\frac{1}{2x^2-1}\right)' = 5\cdot\left(-\frac{4x}{(2x^2-1)^2}\right) = -\frac{20x}{(2x^2-1)^2}$$

Règles de dérivation (suite et fin)

5. $\boxed{(u \circ v(x))'} = (u(v(x)))' = u'(v(x)) \cdot \underbrace{v'(x)}_{\text{dérivée interne}}$

en particulier :

5.1 $\boxed{((u)^n)' = n \cdot u^{n-1} \cdot u'}$

exemple : $(x^3+3x+1)^5 = 5(x^3+3x+1)^4(3x^2+3)$

$u = x^3+3x+1$

$u' = 3x^2+3$

5.2 $\boxed{(\sqrt{u})' = \frac{1}{2\sqrt{u}} \cdot u' = \frac{u'}{2\sqrt{u}}}$

exple : $\left(\sqrt{x^2+2x}\right)' = \frac{2x+2}{2\sqrt{x^2+2x}} = \frac{\cancel{2}(x+1)}{\cancel{2}\sqrt{x^2+2x}} = \frac{x+1}{\sqrt{x^2+2x}}$

$u = x^2+2x$

$u' = 2x+2$

Exples : a) $f(x) = \dfrac{(x-1)^3}{x+2}$

$u = (x-1)^3 \qquad v = x+2$

$u' = 3(x-1)^2 \cdot 1 \qquad v' = 1$

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

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

$$= \frac{(x-1)^2\left[3(x+2) - (x-1)\right]}{(x+2)^2}$$

$$= \frac{(x-1)^2(3x+6-x+1)}{(x+2)^2} = \frac{(x-1)^2(2x+7)}{(x+2)^2}$$

b) $f(x) = \dfrac{(2x-5)^2}{x^3}$

$u = (2x-5)^2 \qquad v = x^3$

$u' = 2(2x-5)\cdot 2 \qquad v' = 3x^2$

$\quad = 4(2x-5)$

$$f'(x) = \frac{4x^3(2x-5) - 3x^2(2x-5)^2}{x^6} = \frac{\cancel{x^2}(2x-5)\left[4x - 3(2x-5)\right]}{x^{\cancel{6}\,4}}$$

$$= \frac{(2x-5)(4x-6x+15)}{x^4} = \frac{(2x-5)(-2x+15)}{x^4}$$