

$$3) \quad f'(x) = (u(x) \cdot v(x))' = \boxed{(u \cdot v)' = u' \cdot v + u \cdot v'} \quad \triangle !$$

exps: $\left[\underbrace{(x^2+2x+5)}_u \cdot \underbrace{(x^3+1)}_v \right]' = (2x+2)(x^3+1) + (x^2+2x+5) \cdot 3x^2$

$$= (2x+2)(x^3+1) + 3x^2(x^2+2x+5)$$

$$= 2x^4 + 2x^3 + 2x + 2 + 3x^4 + 6x^3 + 15x^2$$

$$= 5x^4 + 8x^3 + 15x^2 + 2x + 2$$

$u = x^2 + 2x + 5$ $v = x^3 + 1$
 $u' = 2x + 2$ $v' = 3x^2$

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

$u = \sqrt{x}$ $v = x^2 - 1$
 $u' = \frac{1}{2\sqrt{x}}$ $v' = 2x$

$$4) \longrightarrow 4) \quad f'(x) = \left(\frac{u(x)}{v(x)} \right)' = \boxed{\left(\frac{u}{v} \right)' = \frac{u'v - uv'}{v^2}} \quad \triangle !$$

exemple: $\left(\frac{x+5}{2x-1} \right)' = \frac{1(2x-1) - (x+5) \cdot 2}{(2x-1)^2} = \frac{2x-1-2x-10}{(2x-1)^2}$

$u = x+5$ $v = 2x-1$
 $u' = 1$ $v' = 2$

$$= \frac{-11}{(2x-1)^2}$$

ex 2.7.18 ~~d)~~ $\rightarrow$ g)

$$4) \text{ (suite)} \left(\frac{u}{v} \right)' = \frac{u'v - uv'}{v^2}$$

$$\text{si } u(x) = 1 \quad \Rightarrow \quad \left(\frac{1}{v} \right)' = \frac{0 \cdot v - 1 \cdot v'}{v^2}$$

$u' = 0$

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

$$\text{exemples : a) } \left(\frac{1}{x^2+3} \right)' = -\frac{2x}{(x^2+3)^2}$$

$$v = x^2 + 3$$

$$v' = 2x$$

$$\text{b) } \left(\frac{743}{x^3} \right)' = \left(743 \cdot \frac{1}{x^3} \right)' \stackrel{1)}{=} 743 \left(\frac{1}{x^3} \right)' \stackrel{4)}{=} 743 \cdot \left(-\frac{3x^2}{x^6} \right)$$

$$v = x^3$$

$$v' = 3x^2$$

$$= -\frac{2229}{x^4}$$