

2.9.7

02.02.24

i)  $f(x) = x^2 + 5x - 6$

j)  $f(x) = x^3 + 5x^2 - 2x + 4$

k)  $f(x) = \frac{2}{3}x^3 - \frac{5}{2}x^2 + 2x + 4$

l)  $f(x) = 2x^5 - \frac{7}{6}x^3 + \frac{3}{4}x^2 - x + \sqrt{2}$

i)  $f'(x) = 2x + 5$

j)  $f'(x) = 3x^2 + 10x - 2$

k)  $f'(x) = 2x^2 - 5x + 2$

l)  $f'(x) = 10x^4 - \frac{7}{3}x^2 + \frac{3}{2}x - 1$

2.9.8 Calculer la dérivée de chacune des fonctions suivantes :

a)  $f(x) = (x+1)(x-3)$

b)  $f(x) = x(x^2+5)$

c)  $f(x) = (7x^2-4x+3)(5-2x)$

d)  $f(x) = (2x-1)(2-2x)(1+x)$

a)  $f'(x) = u'v + uv' = 1 \cdot (x-3) + (x+1) \cdot 1 = x-3+x+1 = 2x-2$

$$u = (x+1), u' = 1$$

$$v = (x-3), v' = 1$$

c)  $f'(x) = u'v + uv' = (14x-4) \cdot (5-2x) + (7x^2-4x+3) \cdot (-2) = 70x - 20 - 28x^2 + 8x - 14x^2 + 8x - 6$

$$u = (7x^2-4x+3), u' = (14x-4)$$

$$= -42x^2 + 86x - 26$$

$$v = (5-2x), v' = -2$$

$$\text{h) } f(x) = \frac{x^3 - 10x^2}{1 - x}$$

$$\text{i) } f(x) = \frac{8x^2 - 8x + 3}{4x^2 - 1}$$

$$u' = 3x^2 - 20x$$

$$v' = -1$$

$$\frac{(3x^2 - 20x)(1 - x) - (-1)(x^3 - 10x^2)}{(1 - x)^2}$$

$$\frac{(3x^2 - 3x^3 - 20x + 20x^2) - (-x^3 + 10x^2)}{(1 - x)^2}$$

$$= \frac{-2x^3 + 13x^2 - 20x}{(1 - x)^2}$$

2.9.10 Calculer la dérivée de chacune des fonctions suivantes :

a)  $f(x) = (2x + 3)^4$

b)  $f(x) = (3 - x)^5$

g)  $f(x) = (2x + 5)^3(3x - 1)^4$

$$a) f'(x) = 4(2x+3)^3 \cdot 2 = 8(2x+3)^3$$

$$b) f'(x) = 5(3-x)^4 \cdot (-1) = -5(3-x)^4$$

$$g) \begin{aligned} u &= (2x+5)^3 & u' &= 3(2x+5)^2 \cdot 2 = 6(2x+5)^2 \\ v &= (3x-1)^4 & v' &= 4(3x-1)^3 \cdot 3 = 12(3x-1)^3 \end{aligned}$$

$$\begin{aligned} f'(x) &= u'v + uv' = 6(2x+5)^2 \cdot (3x-1)^4 + (2x+5)^3 \cdot 12(3x-1)^3 \\ &= 6((2x+5)^2(3x-1)^3) \cdot [(3x-1) + 2(2x+5)] \\ &= 6(2x+5)^2(3x-1)^3 \cdot (7x+9) \end{aligned}$$

$$g \text{ bis) } f(x) = (4x+1)^4 \cdot (2x^3+1)^3$$

$$\begin{aligned} u &= (4x+1)^4 & ; & & u' &= 4(4x+1)^3 \cdot 4 = 16(4x+1)^3 \\ v &= (2x^3+1)^3 & ; & & v' &= 3(2x^3+1)^2 \cdot 6x^2 = 18x^2(2x^3+1)^2 \end{aligned}$$

$$f'(x) = 16(4x+1)^3 \cdot (2x^3+1)^3 + (4x+1)^4 \cdot 18x^2(2x^3+1)^2$$

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