

Méthodes de dérivation : exercice n°4 p.27

a) $h(x) = (3x^2+2) \cdot (x^2-4)$

$$\begin{aligned}h'(x) &= 6x \cdot (x^2-4) + (3x^2+2) \cdot 2x \\ &= 2x \cdot [3(x^2-4) + (3x^2+2)] \\ &= 2x \cdot (3x^2-12 + 3x^2+2) \\ &= 2x \cdot (6x^2-10) = 4x \cdot (3x^2-5)\end{aligned}$$

b) $f(x) = (x^2+1)(3x+4)$

$$\begin{aligned}f'(x) &= 2x \cdot (3x+4) + (x^2+1) \cdot 3 \\ &= 6x^2+8x+3x^2+3 = 9x^2+8x+3\end{aligned}$$

c) $f(x) = (x^2-1) \cdot (x-2)$

$$\begin{aligned}f'(x) &= 2x \cdot (x-2) + (x^2-1) \cdot 1 \\ &= 2x^2-4x+x^2-1 = 3x^2-4x-1\end{aligned}$$

d) $f(x) = (x^2-2)^3 \cdot (4x+x^3)^2$

$$\begin{aligned}f'(x) &= 3 \cdot (x^2-2)^2 \cdot 2x \cdot (4x+x^3)^2 + (x^2-2)^3 \cdot 2 \cdot (4x+x^3) \cdot (4+3x^2) \\ &= 2 \cdot (x^2-2)^2 \cdot (4x+x^3) \cdot [3x(4x+x^3) + (x^2-2) \cdot (4+3x^2)] \\ &= 2 \cdot (x^2-2)^2 \cdot (4x+x^3) \cdot (12x^2+3x^4+4x^2+3x^4-8-6x^2) \\ &= 2 \cdot (x^2-2)^2 \cdot (4x+x^3) \cdot (6x^4+10x^2-8) \\ &= 4 \cdot (x^2-2)^2 \cdot (4x+x^3) \cdot (3x^4+5x^2-4)\end{aligned}$$

e) $f(x) = (x+3)^2 \cdot (3x^2-4)$

$$\begin{aligned}f'(x) &= 2 \cdot (x+3) \cdot (3x^2-4) + (x+3)^2 \cdot 6x \\ &= 2 \cdot (x+3) \cdot [(3x^2-4) + 3x(x+3)] \\ &= 2 \cdot (x+3) \cdot (3x^2-4 + 3x^2+9x) \\ &= 2 \cdot (x+3) \cdot (6x^2+9x-4)\end{aligned}$$