

# Règles de dérivation

$$(u+v)' = u' + v'$$

$$(Ku)' = K u' \quad \text{avec } K \in \mathbb{R}$$

$$(uv)' = u'v + uv'$$

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

Exemple: Calculer  $f'(x)$  pour

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

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

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

$$1) f(x) = uv \quad \text{avec} \quad u = 3x^2 - 2x \quad v = 5x - 1$$
$$u' = 6x - 2 \quad v' = 5$$

$$\begin{aligned} f'(x) &= u'v + uv' = (6x - 2)(5x - 1) + (3x^2 - 2x)(5) = \\ &= 30x^2 - 6x - 10x + 2 + 15x^2 - 10x = \\ &= 45x^2 - 26x + 2 \end{aligned}$$

$$2) f(x) = \frac{u}{v} \quad \text{avec} \quad u = x^2 - 4 \quad v = 3x - 2$$
$$u' = 2x \quad v' = 3$$

$$\begin{aligned}
 f'(x) &= \frac{u'v - uv'}{v^2} = \frac{(2x)(3x-2) - (x^2-4)(3)}{(3x-2)^2} = \\
 &= \frac{6x^2 - 4x - 3x^2 + 12}{(3x-2)^2} = \\
 &= \frac{3x^2 - 4x + 12}{(3x-2)^2}
 \end{aligned}$$

$$\begin{aligned}
 3) \quad f(x) &= \frac{u}{v} \quad \text{avec} \quad u = 1 \quad v = 3x^2 - x \\
 &\quad u' = 0 \quad v' = 6x - 1
 \end{aligned}$$

$$\begin{aligned}
 f'(x) &= \frac{u'v - uv'}{v^2} = \frac{(0)(3x^2 - x) - (1)(6x - 1)}{(3x^2 - x)^2} = \\
 &= \frac{-(6x - 1)}{(3x^2 - x)^2}
 \end{aligned}$$

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