

Sciences physiques.

Samedi 06 aôut 2022

- Maths -

Exercices : Dérivabilité.

$$1) f(x) = 2x^2 + 3x \quad ; \quad 2) f(x) = -3\sqrt{x}$$
$$\begin{aligned} f'(x) &= 2x + 3 \\ &= 4x + 0 \\ &= 4 \end{aligned}$$

$$3) f(x) = x\sqrt{x} \quad ; \quad 4) f(x) = (2x-1)(3x+2)$$
$$\begin{aligned} f'(x) &= 1 \times \sqrt{x} + x \times \frac{1}{2\sqrt{x}} \\ &= \sqrt{x} + \frac{x}{2\sqrt{x}} \end{aligned}$$

$$5) f(x) = \frac{x}{x^2+9} \quad ; \quad 6) \frac{x+5}{x-1}$$
$$\begin{aligned} f'(x) &= \frac{1}{x^2+0} \\ &= -2x \end{aligned}$$
$$\begin{aligned} f'(x) &= \frac{(x-1)-(x+5)x}{(x-1)^2} \\ &= 1x-1-(1x+5x) \\ &= 1x-1-6x \end{aligned}$$

$$7) f(x) = \frac{\sqrt{x}+4}{x-3} \quad ; \quad 8) f(x) = 2x^6 - 3x^4$$
$$\begin{aligned} f'(x) &= \frac{1}{\sqrt{2}\sqrt{x}} - \frac{4}{x^2} \\ &= 12x - 12x \\ &= 12 - 12 \end{aligned}$$

$$9) f(x) = (\sin x)^2 \quad ; \quad 10) f(x) = 4 \sin(2x) + \cos(2x)$$
$$\begin{aligned} f'(x) &= 2 \sin x \times \cos(x) \\ &= 2 \sin(2x) \end{aligned}$$
$$\begin{aligned} f'(x) &= 4 \sin(2x) + \cos(2x) - \sin(2x) \\ &= 4 \cos(2x) - \sin(2x) \end{aligned}$$

$$11) f(x) = \left(\frac{4x-1}{x+2}\right)^3 \quad ; \quad 12) f(x) = \cos(-2x+5)$$
$$\begin{aligned} f'(x) &= 3 \left(\frac{4x-1}{x+2}\right)^2 \\ &= -4(x+2) - (4x-1) \\ &= (x+2)^2 \end{aligned}$$
$$\begin{aligned} f'(x) &= -\sin(-2x+5) \\ &= \sin(-2+0) \end{aligned}$$

$$13) f(x) = \sin(x^2) \quad ; \quad 14) f(x) = \frac{1}{3}x^3 + \frac{1}{2}x^2 + x$$
$$\begin{aligned} f'(x) &= \cos(x^2) \\ &= \cos(2x) \end{aligned}$$
$$\begin{aligned} f'(x) &= \frac{1}{3}x^2 + \frac{1}{2}x + 1 \\ &= 2x + 1 + 0 \end{aligned}$$

$$15) f(x) = 12x^2 - 6x + 1$$
$$f'(x) = 24x - 6 + 0$$

$$16) f(x) = e^x \quad ; \quad 17) f(x) = 5x^2 + x - 7e^{6x}$$
$$\begin{aligned} f'(x) &= x)e^{x-3x} \\ &= 10x + 1 - 42e^{6x} \end{aligned}$$

$$18) f(x) = \frac{3e^x - 4}{e^x + 2} \quad ; \quad 19) f(x) = \frac{e^{-2x+1}}{e^{-2x+2}}$$
$$\begin{aligned} f'(x) &= \frac{4e^x - 4}{(e^x + 2)^2} \\ &= \frac{4(e^x + 2) - (4e^{2x} - 4)}{(e^x + 2)^2} \\ &= \frac{4e^x + 8 - (16e^{2x} - 16)}{(e^x + 2)^2} \\ &= \frac{4e^x + 8 - 16e^{2x} + 16}{(e^x + 2)^2} \end{aligned}$$

$$20) f(x) = x e^{5x} \quad ; \quad 21) \frac{\sqrt{e^{-5x}}}{e^x}$$
$$\begin{aligned} f'(x) &= x e^{5x} \\ &= 5x e^{5x} \end{aligned}$$
$$\begin{aligned} f'(x) &= \sqrt{-5e^{-5x}} \\ &= \frac{1}{2\sqrt{-5e^{-5x}}} \end{aligned}$$

$$22) f(x) = x^2 \sqrt{x}$$
$$f'(x) = 2x \times \sqrt{x} + x^2 \times \frac{1}{2\sqrt{x}}$$

$$=$$
$$23) f(x) = (3x - 2)^2$$
$$f'(x) = 18x - 12$$