

Corrigés Savoirs Fc. 4

Corrigé Exercice 9

$$1) \\ f(x) = 2x^3 - 5x^2 + 3x + 7$$

$$f'(x) = 6x^2 - 10x + 3$$

$$f''(x) = 12x - 10$$

$$g(x) = \frac{2x-3}{x}$$

$$g'(x) = \frac{2x - (2x-3)}{x^2} = \frac{3}{x^2}$$

$$g''(x) = \frac{0 \times x^2 - 3 \times 2x}{x^4} \\ = -\frac{6x}{x^4} = -\frac{6}{x^3}$$

$$G(x) = e^{2x}$$

$$G'(x) = 2e^{2x}$$

$$G''(x) = 4e^{2x}$$

$$h(x) = \frac{x^5}{20} - 2x^7$$

$$h'(x) = \frac{x^4}{4} - 14x^6$$

$$h''(x) = x^3 - 84x^5$$

$$i(x) = \ln(x)$$

$$i'(x) = \frac{1}{x}$$

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

$$F(x) = (x^2 + 1)e^x$$

$$F'(x) = 2xe^x + (x^2 + 1)e^x \\ = (x^2 + 2x + 1)e^x$$

$$F''(x) = (2x+2)e^x + (x^2+2x+1)e^x \\ = (x^2 + 4x + 3)e^x$$

$$2) \\ f(x) = \ln(3x+1)$$

$$f'(x) = \frac{3}{3x+1}$$

$$f''(x) = \frac{-9}{(3x+1)^2}$$

$$g(x) = e^{5x^2-2}$$

$$g'(x) = 10xe^{5x^2-2}$$

$$g''(x) = 10e^{5x^2-2} + 100x^2 e^{5x^2-2} = (100x^2 + 10)e^{5x^2-2}$$

$$h(x) = 2x^2 + 3x \ln(x)$$

$$h'(x) = 4x + 3 \ln(x) + \frac{3x}{x} \\ = 4x + 3 \ln(x) + 3$$

$$h''(x) = 4 + \frac{3}{x}$$

$$i(x) = (2x-1)e^{0,5x}$$

$$i'(x) = 2e^{0,5x} + 0,5(2x-1)e^{0,5x} = (x+1,5)e^{0,5x}$$

$$i''(x) = e^{0,5x} + 0,5(x+1,5)e^{0,5x} = (0,5x+1,75)e^{0,5x}$$

$$j(x) = xe^{4x-7}$$

$$j'(x) = e^{4x-7} + x \times 4e^{4x-7} = (4x+1)e^{4x-7}$$

$$j''(x) = 4e^{4x-7} + 4(4x+1)e^{4x-7} = (16x+8)e^{4x-7}$$

$$m(x) = (x^2 - 3x + 6)e^{x^2-3} \Rightarrow m'(x) = (2x^3 - 6x^2 + 14x - 3)e^{x^2-3} \Rightarrow m''(x) = (4x^4 - 12x^3 + 34x^2 - 18x + 14)e^{x^2-3}$$

$$k(x) = 0,1x^4 - 0,5x^2 + 1,6$$

$$k'(x) = 0,4x^3 - x$$

$$k''(x) = 1,2x^2 - 1$$

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

$$j'(x) = \frac{-2x \times 3x - (2-x^2) \times 3}{9x^2} \\ = \frac{-3x^2 + 6}{9x^2}$$

$$j''(x) = \frac{-6x \times 9x^2 - (-3x^2 + 6) \times 18x}{81x^4} \\ = \frac{-108x}{81x^4} = \frac{-4}{3x^3}$$

$$k(x) = \ln(x^2 + 4)$$

$$k'(x) = \frac{2x}{x^2 + 4}$$

$$k''(x) = \frac{2(x^2 + 4) - 2x \times 2x}{(x^2 + 4)^2} \\ = \frac{-2x^2 + 8}{(x^2 + 4)^2}$$

$$p(x) = 4 - (2x+1) \ln x$$

$$p'(x) = -2 \ln x - (2x+1) \times \frac{1}{x} \\ = -2 \ln x - \frac{2x+1}{x}$$

$$p''(x) = -\frac{2}{x} - \frac{2x - (2x+1)}{x^2} \\ = \frac{-2x+1}{x^2}$$

Corrigé Exercice 10

$$1) p'(x) = 5x^4 - 8x^3 + 9x^2 - 4$$

$$p^{(3)}(x) = 60x^2 - 48x + 18$$

$$p''(x) = 20x^3 - 24x^2 + 18x$$

$$p^{(4)}(x) = 120x - 48$$

$$\text{et } p^{(5)}(x) = 120$$

$$2) f^{(5)}(x) = 2 \times (8 \times 7 \times 6 \times 5 \times 4x^3) - (6 \times 5 \times 4 \times 3 \times 2x) - 0 \\ = 13\,440x^3 - 720x$$