

2.1

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

$$f'(x) = 2 \cdot 2x + 3 \cdot 1 - 0$$

$$f'(x) = 4x + 3$$

$$b) f(x) = 1 - x^2 - x$$

$$f'(x) = 0 - 2x - 1$$

$$f'(x) = -2x - 1$$

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

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

$$d) f(x) = 20x^3 - 50x^2 + 30x$$

$$f'(x) = 20 \cdot 3x^2 - 50 \cdot 2x + 30 \cdot 1$$

$$f'(x) = 60x^2 - 100x + 30$$

$$e) f(x) = x^{10} - x^8 + x^6 - x^4 + x^2$$

$$f'(x) = 10x^9 - 8x^7 + 6x^5 - 4x^3 + 2x$$

$$f) f(x) = \pi + 3500$$

$$f'(x) = 0 + 0 = 0$$

$$g) f(x) = \frac{1}{2}x^2 + \frac{3}{4}x + \frac{4}{5}$$

$$f'(x) = \frac{1}{2} \cdot 2x + \frac{3}{4} \cdot 1 + 0$$

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

$$h) f(x) = \frac{1}{5}x^5 + \frac{1}{4}x^4 + \frac{1}{3}x^3 + \frac{1}{2}x^2 + x + 1$$

$$f'(x) = \frac{1}{5} \cdot 5x^4 + \frac{1}{4} \cdot 4x^3 + \frac{1}{3} \cdot 3x^2 + \frac{1}{2} \cdot 2x + 1 + 0$$

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

$$i) f(x) = -x^{17} + x^{13}$$

$$f'(x) = -17x^{16} + 13x^{12}$$

$$j) f(x) = (x-1)(x+1) \Rightarrow f(x) = x^2 - 1 \Rightarrow f'(x) = 2x + 0 = 2x$$

ou  $\underbrace{u \cdot v} \Rightarrow (u \cdot v)' = u' \cdot v + u \cdot v'$

$$f(x) = (x-1)(x+1) \Rightarrow f'(x) = 1(x+1) + (x-1) \cdot 1$$

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

$$k) f(x) = (x-3)(x+2) = x^2 - x - 6 \Rightarrow f'(x) = 2x - 1$$

ou

$$f(x) = (x-3)(x+2) \Rightarrow f'(x) = 1(x+2) + (x-3) \cdot 1$$

$$f'(x) = x+2 + x-3$$

$$f'(x) = 2x - 1$$

$$l) f(x) = x^4 + x^3$$

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

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

$$f'(x) = 4 \cdot 3x^2 + 2 \cdot 2x + 7 \cdot 1 + 0$$

$$f'(x) = 12x^2 + 4x + 7$$

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

$$f'(x) = \frac{1}{2} \cdot 3x^2 + 4 \cdot 1$$

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

$$o) f(x) = \sqrt{3}x + \pi$$

$$f'(x) = \sqrt{3} \cdot 1 + 0$$

$$f'(x) = \sqrt{3}$$

$$p) f(x) = 6x^4 - 2x^3 + x^2 - 9x + 5$$

$$f'(x) = 6 \cdot 4x^3 - 2 \cdot 3x^2 + 2x - 9 \cdot 1 + 0$$

$$f'(x) = 24x^3 - 6x^2 + 2x - 9$$

$$q) f(x) = x^{103} + 2x^{57} - 5x^4 + 4$$

$$f'(x) = 103x^{102} + 2 \cdot 57x^{56} - 5 \cdot 4x^3 + 0$$

$$f'(x) = 103x^{102} + 114x^{56} - 20x^3$$

$$r) f(x) = (4x-11)(x^2+x+7)$$

$$f(x) = 4x^3 + 4x^2 + 28x - 11x^2 - 11x - 77$$

$$f(x) = 4x^3 - 7x^2 + 17x - 77$$

$$f'(x) = 4 \cdot 3x^2 - 7 \cdot 2x + 17 \cdot 1 - 0$$

$$f'(x) = 12x^2 - 14x + 17$$

ou ... (comme pour j) et k)

$$s) f(x) = (5x+3)(x^3+5)$$

$$f(x) = 5x^4 + 25x + 3x^3 + 15$$

$$f'(x) = 5 \cdot 4x^3 + 25 \cdot 1 + 3 \cdot 3x^2$$

$$f'(x) = 20x^3 + 25 + 9x^2$$

ou ...

$$t) f(x) = (x^2+7x)(3x^2-x-3)$$

$$f(x) = 3x^4 - x^3 - 3x^2 + 21x^3 - 7x^2 - 21x$$

$$f(x) = 3x^4 + 20x^3 - 10x^2 - 21x$$

$$f'(x) = 3 \cdot 4x^3 + 20 \cdot 3x^2 - (10 \cdot 2x - 21 \cdot 1)$$

$$f'(x) = 12x^3 + 60x^2 - 20x - 21$$

ou ...

$$u) f(x) = (x+\sqrt{5})(x^2+2)$$

$$f(x) = x^3 + 2x + \sqrt{5}x^2 + 2\sqrt{5}$$

$$f'(x) = 3x^2 + 2 \cdot 1 + \sqrt{5} \cdot 2x + 0$$

$$f'(x) = 3x^2 + 2 + 2\sqrt{5}x$$

ou ...

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

$$f(x) = 6x^3 - 21x^2 + 8x - 28$$

$$f'(x) = 6 \cdot 3x^2 - 21 \cdot 2x + 8 \cdot 1 - 0$$

$$f'(x) = 18x^2 - 42x + 8$$