

2.6

$$a) f(x) = \frac{2}{x^2} + \frac{5}{x^3} + 41$$

$$f'(x) = \frac{0 \cdot x^2 - 2 \cdot 2x}{x^4} + \frac{0 \cdot x^3 - 5 \cdot 3x^2}{x^6} = \frac{-4x}{x^4} + \frac{-15x^2}{x^6}$$

$$f'(x) = -\frac{4}{x^3} - \frac{15}{x^4}$$

$$b) f(x) = \frac{6}{x-5}$$

$$f'(x) = \frac{0 \cdot (x-5) - 6 \cdot 1}{(x-5)^2} = -\frac{6}{(x-5)^2}$$

$$c) f(x) = \frac{7x+1}{2x-3}$$

$$f'(x) = \frac{7(2x-3) - (7x+1) \cdot 2}{(2x-3)^2} = \frac{14x-21-14x-2}{(2x-3)^2}$$

$$f'(x) = -\frac{23}{(2x-3)^2}$$

$$d) f(x) = \frac{x^2+3}{2x+7}$$

$$f'(x) = \frac{2x(2x+7) - (x^2+3) \cdot 2}{(2x+7)^2} = \frac{4x^2+14x-2x^2-6}{(2x+7)^2}$$

$$f'(x) = \frac{2x^2+14x-6}{(2x+7)^2}$$

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

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

$$f'(x) = \frac{2x^3+3x^2}{(x+1)^2} = \frac{x^2(2x+3)}{(x+1)^2} \leftarrow \text{factorisé}$$

$$f) f(x) = x + 3 + \frac{x+3}{6x-3}$$

$$f'(x) = 1 + 0 + \frac{1(6x-3) - (x+3) \cdot 6}{(6x-3)^2} = 1 + \frac{6x-3-6x-18}{(6x-3)^2}$$

$$f'(x) = 1 - \frac{21}{(6x-3)^2} = 1 - \frac{21}{3^2(3x-1)^2} = 1 - \frac{7}{3(3x-1)^2} \quad (\text{fraction rationnelle factorisée})$$

$$g) f(x) = \frac{3x^2+6}{2x^3-1}$$

$$f'(x) = \frac{6x(2x^3-1) - (3x^2+6) \cdot 6x^2}{(2x^3-1)^2} = \frac{12x^4-6x-18x^4-36x^2}{(2x^3-1)^2}$$

$$f'(x) = \frac{-6x^4-36x^2-6x}{(2x^3-1)^2} = \frac{-6x(x^3+6x+1)}{(2x^3-1)^2} \leftarrow \text{factorisé}$$

$$h) f(x) = \frac{1}{x^5+4x^4-11x^3+12}$$

$$f'(x) = \frac{0 \cdot (x^5+4x^4-11x^3+12) - 1 \cdot (5x^4+16x^3-33x^2+0)}{(x^5+4x^4-11x^3+12)^2}$$

$$f'(x) = - \frac{5x^4+16x^3-33x^2}{(x^5+4x^4-11x^3+12)^2}$$