

**Ex. 1** — Calcul de dérivées

1.  $f'_1(x) = 0$
2.  $f'_2(x) = 3$
3.  $f'_3(x) = -6$
4.  $f'_4(x) = 9$
5.  $f'_5(x) = -1, 2$
6.  $f'_6(x) = 2x$
7.  $f'_7(x) = 3x^2$
8.  $f'_8(x) = 4x^3$
9.  $f'_9(x) = 10x^9$
10.  $f'_{10}(x) = 102x^{101}$
11.  $f'_{11}(x) = 4x^2$
12.  $f'_{12}(x) = -10x + 6$
13.  $f'_{13}(x) = 30x^2 - 24x + 1$
14.  $f'_{14}(x) = x + 5x^2$
15.  $f'_{15}(x) = \frac{2x + 6}{3}$
16.  $f_1(x) = -\frac{1}{x^2}$
17.  $f_2(x) = \frac{1}{2\sqrt{x}}$
18.  $f_3(x) = \frac{2}{x^2}$
19.  $f_4(x) = \frac{1}{3\sqrt{x}} + 10x$
20.  $f_5(x) = \frac{1}{4\sqrt{x}}$
21.  $f_6(x) = -\frac{1}{x^2} - \frac{3}{\sqrt{x}}$
22.  $f_7(x) = 15x^2 + \frac{1}{x^2}$
23.  $f_8(x) = 5x^3 + \frac{9}{x^2}$
24.  $f_9(x) = 33x^{10} + 1 - \frac{1}{x^2} - \frac{4}{\sqrt{x}}$
25.  $f'_1(x) = 1 \times (x^2 + 6) + x \times 2x = 3x^2 + 6$
26.  $f'_2(x) = 2 \times (-x - 3) + (2x + 1) \times (-1) = -4x - 7$
27.  $f'_3(x) = 10x \times (-6x + 2) + 5x^2 \times (-6) = -90x^2 + 20x$
28.  $f'_4(x) = \frac{1}{2\sqrt{x}} \times (-x^2 + x) + \sqrt{x} \times (-2x + 1) = \frac{1}{2}(3 - 5x)\sqrt{x}$
29.  $f'_5(x) = \frac{2}{2\sqrt{x}} \times (3 - x) + 2\sqrt{x} \times (-1) = -\frac{3(x - 1)}{\sqrt{x}}$
30.  $f'_6(x) = -\frac{1}{x^2} \times (x^2 - 1) + \frac{1}{x} \times 2x = \frac{1}{x^2} + 1$

$$31. f_7'(x) = -\frac{2}{x^2} \times (x+2) + \left(\frac{2}{x} - 1\right) \times 1 = -\frac{4}{x^2} - 1$$

$$32. f_1'(x) = \frac{1 \times (x+1) - x \times 1}{(x+1)^2} = \frac{1}{(x+1)^2}$$

$$33. f_2'(x) = \frac{0 \times (x^2-1) - (-2) \times 2x}{(x^2-1)^2} = \frac{4x}{(x^2-1)^2}$$

$$34. f_3'(x) = \frac{1 \times (2x-1) - (x+5) \times 2}{(2x-1)^2} = \frac{-11}{(2x-1)^2}$$

$$35. f_4'(x) = \frac{\frac{5}{2\sqrt{x}} \times (7-3x) - 5\sqrt{x} \times (-3)}{(7-3x)^2} = \frac{5(3x+7)}{2(7-3x)^2\sqrt{x}}$$

$$36. f_5'(x) = \frac{(2x+3) \times (x+5) - (x^2+3x-7) \times 1}{(x+5)^2} = \frac{x^2+10x+22}{(x+5)^2}$$

$$37. f_6'(x) = 1$$

$$38. f_7'(x) = \frac{3 \times (x-2) - (3x-5) \times 1}{(x-2)^2} + \frac{7}{2\sqrt{x}} = -\frac{1}{(x-2)^2} + \frac{7}{2\sqrt{x}}$$