

# Calcul de dérivées: solutions

1.  $\text{dom } f = \mathbb{R}; \text{ dom } f' = \mathbb{R}$

$$f'(x) = 10(x^2 - x + 2)(2x - 1)$$

2.  $\text{dom } f = \mathbb{R}; \text{ dom } f' = \mathbb{R}$

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

3.  $\text{dom } f = \mathbb{R}^*; \text{ dom } f' = \mathbb{R}^*$

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

4.  $\text{dom } f = \mathbb{R} \setminus \left\{ \frac{1}{2} \right\}; \text{ dom } f' = \mathbb{R} \setminus \left\{ \frac{1}{2} \right\}$

$$f'(x) = -\frac{12}{(2x - 1)^3}$$

5.  $\text{dom } f = \mathbb{R} \setminus \{5\}; \text{ dom } f' = \mathbb{R} \setminus \{5\}$

$$f'(x) = 2 - \frac{3}{(x - 5)^2} = \frac{2x^2 - 20x + 47}{(x - 5)^2}$$

6.  $\text{dom } f = \mathbb{R}_+; \text{ dom } f' = \mathbb{R}_+^*$

$$f'(x) = 2 + \frac{1}{2\sqrt{x}} = \frac{4\sqrt{x} + 1}{2\sqrt{x}}$$

7.  $\text{dom } f = \mathbb{R} \setminus \{1 + \sqrt{2}, 1 - \sqrt{2}\}; \text{ dom } f' = \mathbb{R} \setminus \{1 + \sqrt{2}, 1 - \sqrt{2}\}$

$$f'(x) = -\frac{x^2 - 7 + 8x}{(x^2 - 2x - 1)^2}$$

8.  $\text{dom } f = \left[ \frac{4}{3}, \rightarrow; \text{ dom } f' = \left[ \frac{4}{3}, \rightarrow \right.$

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

9.  $\text{dom } f = \leftarrow, 2] \setminus \{-3\}; \text{ dom } f' = \leftarrow, 2] \setminus \{-3\}$

$$f'(x) = \frac{x - 7}{2\sqrt{(-x + 2)}(x + 3)^2}$$

10.  $\text{dom } f = \left] -\frac{1}{2}, \rightarrow; \text{ dom } f' = \left] -\frac{1}{2}, \rightarrow \right.$

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

11.  $\text{dom } f = [1, \rightarrow; \text{dom } f' = ]1, \rightarrow$

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

12.  $\text{dom } f = \mathbb{R}_+^*; \text{dom } f' = \mathbb{R}_+^*$

$$f'(x) = -\frac{1}{2x\sqrt{x}}$$

13.  $\text{dom } f = \mathbb{R}; \text{dom } f' = \mathbb{R}$

$$f'(x) = (-2 + 28x + 9x^2 + 26x^3) (x^3 + 2x - 1)^2 (2x + 1)^3$$

14.  $\text{dom } f = \mathbb{R} \setminus \left\{ -\frac{1}{4} \right\}; \text{dom } f' = \mathbb{R} \setminus \left\{ -\frac{1}{4} \right\}$

$$f'(x) = \frac{8x^2 + 4x + 13}{(4x + 1)^2}$$

15.  $\text{dom } f = \mathbb{R} \setminus \{1 + \sqrt{6}, 1 - \sqrt{6}\}; \text{dom } f' = \mathbb{R} \setminus \{1 + \sqrt{6}, 1 - \sqrt{6}\}$

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

16.  $\text{dom } f = \mathbb{R} \setminus \left\{ -\frac{1}{2} \right\}; \text{dom } f' = \mathbb{R} \setminus \left\{ -\frac{1}{2} \right\}$

$$f'(x) = 3 + \frac{8}{(2x+1)^3} = \frac{24x^3 + 36x^2 + 18x + 11}{(2x+1)^3}$$

17.  $\text{dom } f = \mathbb{R} \setminus \{-1\}; \text{dom } f' = \mathbb{R} \setminus \{-1\}$

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

18.  $\text{dom } f = \mathbb{R}; \text{dom } f' = \mathbb{R}$

$$f'(x) = (x+1)^2 (5x^2 - 2x + 2)$$

19.  $\text{dom } f = \left[ \frac{2}{3}, \rightarrow; \text{dom } f' = \right] \frac{2}{3}, \rightarrow$

$$f'(x) = 2x - 2 + \frac{3}{2\sqrt{3x-2}}$$

20.  $\text{dom } f = \left] \frac{1}{2}, \rightarrow; \text{dom } f' = \right] \frac{1}{2}, \rightarrow$

$$f'(x) = -\frac{6x-1}{(2x+1)(4x^2-1)\sqrt{2x-1}}$$

21.  $\text{dom } f = \mathbb{R}_+; \text{dom } f' = \mathbb{R}_+^*$

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

22.  $\text{dom } f = [-2, \rightarrow \setminus \{1\}$ ;  $\text{dom } f' = [-2, \rightarrow \setminus \{1\}$

$$f'(x) = -\frac{x^2 + 10x + 13}{2(x-1)^3 \sqrt{x+2}}$$

23.  $\text{dom } f = \mathbb{R}_+^*$ ;  $\text{dom } f' = \mathbb{R}_+^*$

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

24.  $\text{dom } f = \leftarrow, 1] \cup \left[ \frac{3}{2}, \rightarrow \right$ ;  $\text{dom } f' = \leftarrow, 1[ \cup \left] \frac{3}{2}, \rightarrow \right$

$$f'(x) = \frac{4x - 5}{2\sqrt{2x^2 - 5x + 3}}$$

25.  $\text{dom } f = \mathbb{R}$ ;  $\text{dom } f' = \mathbb{R}$

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

26.  $\text{dom } f = \mathbb{R} \setminus \left\{ \sqrt[3]{\frac{3}{2}} \right\}$ ;  $\text{dom } f' = \mathbb{R} \setminus \left\{ \sqrt[3]{\frac{3}{2}} \right\}$

$$f'(x) = \frac{21x^2}{(3 - 2x^3)^2}$$