★★ *Automatismes : dérivées bis* ★★

Astuce

On apprend les formules par coeur

Calculer les dérivées

1. $f(x) = x^5 - 3x^4 + 2x^2 - 7x + 1$
2. $f(x) = \frac{3}{2}x^4 - 2x^3 + \frac{1}{2}x - 4$
3. $f(x) = \frac{1}{2x-3}$
4. $f(x) = \sqrt{3x+1}$
5. $f(x) = (x^2 - 2x + 1)(2x + 3)$
6. $f(x) = \frac{x^2+1}{2x-1}$
7. $f(x) = (3x^2 - 1)(x^2 + 2x)$
8. $f(x) = \frac{1}{x^2+1}$
9. $f(x) = \sqrt{x^2+4}$
10. $f(x) = (x + 1)(x - 2)(2x + 3)$
11. $f(x) = x^2\sqrt{x}$
12. $f(x) = \frac{x+1}{x^2-1}$
13. $f(x) = 2x^4 - 5x^3 + 3x^2 - x + 6$
14. $f(x) = \frac{x^2+2x-3}{x^2+1}$
15. $f(x) = \frac{3x}{x^2+4}$
16. $f(x) = \sqrt{2x^2+1}$
17. $f(x) = \frac{x^2}{\sqrt{x}}$
18. $f(x) = \frac{x^2-1}{x+1}$
19. $f(x) = (x - 1)(x + 1)(x^2 + 1)$
20. $f(x) = \frac{1}{\sqrt{2x+1}}$

Corrigé

Exercice 1

On considère $f(x) = x^5 - 3x^4 + 2x^2 - 7x + 1$.

On dérive terme à terme :

$$f'(x) = 5x^4 - 12x^3 + 4x - 7$$

Exercice 2

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

On dérive terme à terme :

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

Exercice 3

On considère $f(x) = \frac{1}{2x-3}$.

On utilise la formule de dérivée d'un quotient :

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

Réponses des exercices suivants

4.

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

5.

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

$$= 6x^2 - 2x - 4$$

6.

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

7.

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

$$= 12x^3 + 18x^2 - 2x - 2$$

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

9. $$f'(x) = \frac{x}{\sqrt{x^2+4}}$$

10. $$f'(x) = (x-2)(2x+3) + (x+1)((2x+3) + 2(x-2))$$
$$= 6x^2 + 2x - 7$$

11. $$f'(x) = \frac{5}{2}x^{3/2}$$

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

13. $$f'(x) = 8x^3 - 15x^2 + 6x - 1$$

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

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

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

17. $f(x) = x^{3/2}$ donc $f'(x) = \frac{3}{2}\sqrt{x}$

18. $f(x) = x - 1$ donc $f'(x) = 1$

19. $$f'(x) = 4x^3$$

20.

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