

ANALYSE : LES DERIVEES

Calculs de dérivées

Etudier au préalable toutes les formules
Rappel : Calculer les domaines

$f(x)$	$f'(x)$
1. 80	0
2. $-150x$	-150
3. x^{42}	$42x^{41}$
4. $5x^{81}$	$405x^{80}$
5. $3x^{12} - 5x^5 + x^2 - x + 15$	$36x^{11} - 25x^4 + 2x - 1$
6. $(3x^3 + 2) \cdot (5x^2 - 4)$	$9x^2(5x^2 - 4) + (3x^3 + 2)10x = 75x^4 - 36x^2 + 20x$
7. $(2x^6 + 13x^2 - 2x + 1)^5$	$5(2x^6 + 13x^2 - 2x + 1)^4(12x^5 + 26x - 2)$
8. $\sqrt[23]{x^8}$	$\frac{8}{23\sqrt[23]{x^{15}}}$
9. $(2x + 1)^3 \cdot (x^2 + 2)^2$	$3(2x + 1)^2 2(x^2 + 2) + (2x + 1)^3 (2(x^2 + 2)2x)$ $= 2(2x + 1)^2 (x^2 + 2)(7x^2 + 2x + 6)$
10. $\frac{-5x^5}{19}$	$\frac{-25x^4}{19}$
11. $\frac{-9}{x^8}$	$\frac{72}{x^9}$
12. $\frac{15}{\sqrt[9]{x^5}}$	$\frac{-75}{9x^9\sqrt[9]{x^5}}$
13. $\frac{3x^2 + x - 12}{-3x + 1}$	$\frac{(6x + 1)(-3x + 1) - (3x^2 + x - 12)(-3)}{(-3x + 1)^2}$ $= \frac{-9x^2 + 6x - 35}{(-3x + 1)^2}$

14. $\sqrt{4x^2 + 23}$

$$\frac{4x}{\sqrt{4x^2 + 23}}$$

15. $\frac{2x+5}{(x-2)^3}$

$$\frac{2(x-2)^3 - (2x+5)3(x-2)^2}{(x-2)^6} = \frac{-4x-19}{(x-2)^4}$$

16. $\frac{(2x+1)^6}{3x}$

$$\frac{6(2x+1)^5 \cdot 2 \cdot 3x - (2x+1)^6 \cdot 3}{9x^2} = \frac{(2x+1)^5(10x-1)}{3x^2}$$

17. $\frac{(5x^2-1)^6}{(2x^3+5)^4}$

$$\frac{6(5x^2-1)^5(10x)(2x^3+5)^4 - (5x^2-1)^6 \cdot 4(2x^3+5)^3 \cdot 6x^2}{(2x^3+5)^8} = \frac{12x(5x^2-1)^5(2x+25)}{(2x^3+5)^5}$$

18. $-5 \cos 3x$

$15 \sin 3x$

19. $\cos 2x + \sin 3x$

$-2 \sin 2x + 3 \cos 3x$

20. $2\sin^2 x - \cos^3 x$

$4 \sin x \cos x + 3 \cos^2 x \sin x$

21. $\sin 4x \cos 5x$

$4 \cos 4x \cos 5x - 5 \sin 4x \sin 5x$

22. $(\sin 2x)^3 \operatorname{tg} 6x$

$6 \sin^2 2x \cos 2x \operatorname{tg} 6x + \sin^3 2x \frac{6}{\cos^2 6x}$

23. $\sqrt{\sin 2x}$

$$\frac{\cos 2x}{\sqrt{\sin 2x}}$$

24. $\frac{\sin 3x}{\cos 2x}$

$$\frac{3 \cos 3x \cos 2x + 2 \sin 3x \sin 2x}{\cos^2 2x}$$

25. $\operatorname{tg} \sqrt{x^2 + 1}$

$$\frac{x}{\sqrt{x^2 + 1} \cos^2 \sqrt{x^2 + 1}}$$

$$\begin{aligned} 26. \frac{1+tgx}{1-tgx} &= \frac{\frac{1}{\cos^2 x}(1-tgx) - (1+tgx)\frac{-1}{\cos^2 x}}{(1-tgx)^2} \\ &= \frac{2}{\cos^2 x(1-tgx)^2} \end{aligned}$$

$$\begin{aligned} 27. 3\sin^2\left(5x - \frac{p}{4}\right) &= 6\sin\left(5x - \frac{p}{4}\right)\cos\left(5x - \frac{p}{4}\right)5 \\ &= 15\sin\left(10x - \frac{p}{2}\right) = -15\cos 10x \end{aligned}$$