

**RAPPEL : dérivées des fonctions usuelles**

<b>fonction :</b>	$f(x) = k$ (constante)	$f(x) = ax + b$	$f(x) = x^n$	$f(x) = \frac{1}{x^n}$	$f(x) = \sqrt{x}$
<b>fonction dérivée :</b>	$f'(x) = 0$	$f'(x) = a$	$f'(x) = nx^{n-1}$	$f'(x) = \frac{-n}{x^{n+1}}$	$f'(x) = \frac{1}{2\sqrt{x}}$

**EXERCICE 4A.1** Déterminer la dérivée de la fonction  $f$ .

1.  $f(x) = 3x + 2$       **donc  $f'(x) = 3$**
2.  $f(x) = x^5$
3.  $f(x) = -7x + 2$
4.  $f(x) = -5x + 7$
5.  $f(x) = \frac{1}{x^2}$
6.  $f(x) = 3$
7.  $f(x) = x$
8.  $f(x) = -x + 5$
9.  $f(x) = 5x - 5$
10.  $f(x) = x^4$
11.  $f(x) = \frac{1}{x^7}$
12.  $f(x) = -x$
13.  $f(x) = \frac{1}{x^3}$
14.  $f(x) = x^7$
15.  $f(x) = 0$
16.  $f(x) = 3 - 12x$
17.  $f(x) = \frac{1}{x^3}$
18.  $f(x) = \frac{1}{x^8}$
19.  $f(x) = \frac{1}{x^5}$
20.  $f(x) = \sqrt{x}$
21.  $f(x) = \frac{1}{x^{11}}$
22.  $f(x) = -7$
23.  $f(x) = 8 + x$
24.  $f(x) = \frac{1}{x}$

**EXERCICE 4A.2** Déterminer la dérivée de la fonction  $f$ .

1.  $f(x) = x^5 + x^3$
2.  $f(x) = 5x^7$
3.  $f(x) = 3 \times \frac{1}{x^2}$
4.  $f(x) = 3x - \frac{1}{x}$
5.  $f(x) = 7x^5 + 3x^4 - 2x^3 - 5x^2 + x - 1$
6.  $f(x) = \frac{3}{x^4} + \frac{7}{x^2} - \frac{4}{x}$
7.  $f(x) = \frac{2}{x^3} - \frac{3}{x^4} + \frac{4}{x^5} - \frac{5}{x^6}$
8.  $f(x) = 3x^7 - \frac{8}{x^2} + \frac{2}{x} - 7x^3 + 5$

**CORRIGE – NOTRE DAME DE LA MERCI – MONTPELLIER****EXERCICE 4A.1**Déterminer la dérivée de la fonction  $f$ .

1.  $f(x) = 3x + 2$

**donc  $f'(x) = 3$**

2.  $f(x) = x^5$   $f'(x) = 5x^4$

3.  $f(x) = -7x + 2$

$f'(x) = -7$

4.  $f(x) = -5x + 7$   $f'(x) = -5$

5.  $f(x) = \frac{1}{x^2}$

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

6.  $f(x) = 3$   $f'(x) = 0$

7.  $f(x) = x$

$f'(x) = 1$

8.  $f(x) = -x + 5$   $f'(x) = -1$

9.  $f(x) = 5x - 5$

$f'(x) = 5$

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

11.  $f(x) = \frac{1}{x^7}$

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

12.  $f(x) = -x$   $f'(x) = -1$

13.  $f(x) = \frac{1}{x^3} = x^{-3}$

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

14.  $f(x) = x^7$   $f'(x) = 7x^6$

15.  $f(x) = 0$

$f'(x) = 0$

16.  $f(x) = 3 - 12x$   $f'(x) = -12$

17.  $f(x) = \frac{1}{x^3}$

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

18.  $f(x) = \frac{1}{x^8} = x^{-8}$   $f'(x) = \frac{-8}{x^9} (= -8x^{-9})$

19.  $f(x) = \frac{1}{x^5}$

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

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

21.  $f(x) = \frac{1}{x^{11}}$

$f'(x) = -\frac{11}{x^{12}}$

22.  $f(x) = -7$   $f'(x) = 0$

23.  $f(x) = 8 + x$

$f'(x) = 1$

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

**EXERCICE 4A.2**Déterminer la dérivée de la fonction  $f$ .

1.  $f(x) = x^5 + x^3$

$f'(x) = 5x^4 + 3x^2$

2.  $f(x) = 5x^7$

$f'(x) = 7x^6$

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

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

4.  $f(x) = 3x - \frac{1}{x}$

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

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

$f'(x) = 35x^4 + 12x^3 - 6x^2 + 10x + 1$

6.  $f(x) = \frac{3}{x^4} + \frac{7}{x^2} - \frac{4}{x} (= 3x^{-4} + 7x^{-2} - 4x^{-1})$

$f'(x) = 3 \times \frac{-4}{x^5} + 7 \times \frac{-2}{x^3} - 4 \times \frac{-1}{x^2} = -\frac{12}{x^5} - \frac{14}{x^3} + \frac{4}{x^2}$

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

$f'(x) = 2 \times \frac{-3}{x^4} - 3 \times \frac{-4}{x^5} + 4 \times \frac{-5}{x^6} - 5 \times \frac{-6}{x^7} = \frac{-6}{x^4} + \frac{12}{x^5} - \frac{20}{x^6} + \frac{30}{x^7}$

8.  $f(x) = 3x^7 - \frac{8}{x^2} + \frac{2}{x} - 7x^3 + 5$

$f'(x) = 21x^6 + \frac{16}{x^3} - \frac{2}{x^2} - 21x^2$