Feuille d'exercice n° 02 : **Fonctions usuelles – Fiche d'entraînement – Corrigé**

Exercice 1

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

2) $f'(x) = 20x^3 + 15x^2 + 34x - 3$

3) $f'(x) = -\dfrac{25}{x^6}$

4) $f'(x) = -\dfrac{25}{x^6} - \dfrac{6}{x^3}$

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

6) $f'(x) = -\dfrac{3}{2\sqrt{x^5}}$

7) $f'(x) = \dfrac{2}{3\sqrt[3]{x}} + \dfrac{1}{2\sqrt{x}}$

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

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

10) $f'(x) = \dfrac{5x^4 - 3x^2}{4\sqrt[4]{(x^5-x^3-2)^3}}$

11) $f'(x) = -\dfrac{4x}{3\sqrt[3]{(x^4-1)^2(x^2-1)^2}}$

12) $f'(x) = \dfrac{1}{2\sqrt{x}}.10^{\sqrt{x}}.\ln 10$

13) $f'(x) = -2x\mathrm{e}^{\,3-x^2}$

14) $f'(x) = \dfrac{2\mathrm{e}^{\,2x}(x-1)}{x^3}$

15) $f'(x) = 3^{2x^2}\left(4x\sqrt{x}.\ln 3 + \dfrac{1}{2\sqrt{x}}\right)$

16) $f'(x) = \dfrac{8x^3 - 3x^2 + 6x - 3}{2x^4 - x^3 + 3x^2 - 3x}$

17) $f'(x) = -\dfrac{2\mathrm{e}^{\,x}}{\mathrm{e}^{\,2x}-1}$

18) $f'(x) = \dfrac{1}{1-x^2}$

19) $f'(x) = \dfrac{1-2x}{2x(1-x)}$

20) $f'(x) = \dfrac{2}{3x(x+2)}$

21) $f'(x) = \dfrac{5x-1}{(x-2)(2x-1)}$

Exercice 2

1) $f'(x) = 6x^2\cos(2x^3)$

2) $f'(x) = 5x^4(1+\tan^2(x^5))$

3) $f'(x) = 2x(-2x^5\sin x^2 - 3\sin x^2 + 5x^3\cos x^2)$

4) $f'(x) = \dfrac{2x(-2\cos(2x^3) - 6x^3\sin(2x^3) - 15x\sin(2x^3))}{\cos^2(2x^3)}$

5) $f'(x) = 15x^4\sin^2(x^5)\cos(x^5)$

6) $f'(x) = 12x(-3x^2+2)\sin(-3x^2+2)^2$

Exercice 3 Calculer les dérivées des fonctions suivantes :

1) $f'(x) = \dfrac{15x^{1/4}}{4}$

2) $f'(x) = \dfrac{5}{6x^{1/3}}$

3) $f'(x) = \dfrac{20}{x^6}$

4) $f'(x) = -\dfrac{9}{x^4}$

5) $f'(x) = -\dfrac{1}{2x^{3/4}}$

6) $f'(x) = \dfrac{1}{3x^{2/3}} + \dfrac{1}{5x^{4/5}}$

Exercice 4

1) $f'(x) = \dfrac{-8x^7 + 9x^6 - 12x^2 + 6x}{4x^{10} - 8x^5 + 4}$

2) $f'(x) = \dfrac{9x^6 - 24x^3 - 18x^2}{9x^6 - 12x^3 + 4}$

3) $f'(x) = \dfrac{12x^8 - 12x^5 + 100x^4 + 20x}{9x^8 + 30x^4 + 25}$

4) $f'(x) = \dfrac{56x^{14/3} + 144x^3 - 8x^{8/3} - 72x - 50x^{2/3}}{12x^{10/3} + 36x^{5/3} + 27}$

Exercice 5

1) $f'(x) = \dfrac{15x^2}{\sqrt{1 - 25x^6}}$

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

3) $f'(x) = \dfrac{8x^3}{4x^8 + 1}$

4) $f'(x) = \dfrac{30x(\operatorname{Arcsin}(5x^2))^2}{\sqrt{1 - 25x^4}}$

5) $f'(x) = \dfrac{45x^4(3x^5 + 1)^2}{\sqrt{1 - (3x^5 + 1)^6}}$

6) $f'(x) = -\dfrac{16x \operatorname{Arccos}(4x^2)}{\sqrt{1 - 16x^4}}$

7) $f'(x) = \dfrac{18x^2(-2x^3 - 3)^2}{\sqrt{1 - (-2x^3 - 3)^6}}$

Exercice 6

1) $f'(x) = \dfrac{4}{x \ln 2x^4}$

2) $f'(x) = \dfrac{3}{x \ln 3x^3}$

3) $f'(x) = -\dfrac{3 \sin \ln 4x^3}{x}$

4) $f'(x) = 6xe^{\,e^{3x^2} + 3x^2}$

5) $f'(x) = 24x^2(4x^3 + 5)e^{\,(4x^3+5)^2}$

6) $f'(x) = \dfrac{-3x^3 \ln(4x^2) - 2x^3 - 8}{x}$

7) $f'(x) = \dfrac{5(x^3 - 12)}{x(x^3 - 3)}$

8) $f'(x) = 4xe^{\,5x^4 - 4x^2 - 3}(5x^2 - 2)$

Exercice 7 Déterminer les limites des expressions suivantes.

1) $+\infty$

2) $\dfrac{1}{2}$

3) 0

4) $\dfrac{\pi}{16}$

5) 0

6) $\dfrac{1}{4}$

7) $\dfrac{\pi}{2}$

8) $-\infty$

9) 1

10) 0

Exercice 8 Tableaux à venir.

1) $f' : x \mapsto \dfrac{x-1}{\mathrm{e}^{\,x} - x}$

2) $g' : x \mapsto (\mathrm{e}^{\,x} - 1)(\mathrm{e}^{\,x} - 2)$

3) $\varphi' : x \mapsto -\dfrac{(x-1)(x-3)}{\mathrm{e}^{\,x}}$

4) $\psi' : x \mapsto \dfrac{\mathrm{e}^{\,2x}(2x + \sqrt{6} + 4)(2x - \sqrt{6} + 4)}{2(x+2)^4}$.