Exercice 1

Dérivez :

1. $f_1 : x \longmapsto 4e^x - 2\ln(x)$
2. $f_2 : x \longmapsto e^{4x} - \ln(2x)$
3. $f_3 : x \longmapsto \dfrac{\cos(x) + 1}{4}$
4. $f_4 : x \longmapsto x^3 + \dfrac{1}{x^3}$
5. $f_5 : x \longmapsto x^3 \sin(x)$
6. $f_6 : x \longmapsto \ln(x^2 + x + 1)$
7. $f_7 : x \longmapsto \dfrac{x}{e^x}$
8. $f_8 : x \longmapsto e^{-2x} + \sin(3x)$
9. $f_9 : x \longmapsto e^{-2x} \sin(3x)$
10. $f_{10} : x \longmapsto \dfrac{2}{x^4}$
11. $f_{11} : x \longmapsto e^{x^2}$

12. $f_{12} : x \longmapsto \dfrac{x^5}{\ln(x)}$
13. $f_{13} : x \longmapsto \sqrt{x^2 + 1}$
14. $f_{14} : x \longmapsto \dfrac{1}{x^2 + 3x + 2}$
15. $f_{15} : x \longmapsto x^2 \ln(x)$
16. $f_{16} : x \longmapsto \ln\left(\dfrac{x+1}{x-1}\right)$
17. $f_{17} : x \longmapsto \dfrac{1}{x^3 + x}$
18. $f_{18} : x \longmapsto \cos(e^{-x})$
19. $f_{19} : x \longmapsto \sin(\ln(x))$
20. $f_{20} : x \longmapsto \ln(x^2 + 1)$
21. $f_{21} : x \longmapsto \dfrac{e^{2x}}{x}$

22. $f_{22} : x \longmapsto \dfrac{1}{\sqrt{x^2 + 1}}$
23. $f_{23} : x \longmapsto \arctan(x^2)$
24. $f_{24} : x \longmapsto \sin(x^3)$
25. $f_{25} : x \longmapsto \ln\left(\dfrac{x-3}{1-2x}\right)$
26. $f_{26} : x \longmapsto e^{\sin(x)}$
27. $f_{27} : x \longmapsto \sqrt{1 + \cos^2(x)}$
28. $f_{28} : x \longmapsto \dfrac{x}{\sqrt{x^2 + 4}}$
29. $f_{29} : x \longmapsto \tan(\sqrt{x})$
30. $f_{30} : x \longmapsto e^{\sqrt{1+x^2}}$

Corrigé :

1. $f_1'(x) = 4e^x - \dfrac{2}{x}$
2. $f_2'(x) = 4e^{4x} - \dfrac{1}{x}$
3. $f_3'(x) = -\dfrac{\sin(x)}{4}$
4. $f_4'(x) = 3x^2 - \dfrac{3}{x^4}$
5. $f_5'(x) = 3x^2 \sin(x) + x^3 \cos(x)$
6. $f_6'(x) = \dfrac{2x+1}{x^2 + x + 1}$
7. $f_7'(x) = \dfrac{1-x}{e^x}$
8. $f_8'(x) = -2e^{-2x} + 3\cos(3x)$
9. $f_9'(x) = -2e^{-2x}\sin(3x) + 3e^{-2x}\cos(3x)$
10. $f_{10}'(x) = -\dfrac{8}{x^5}$

11. $f_{11}'(x) = 2xe^{x^2}$
12. $f_{12}'(x) = \dfrac{x^4(5\ln(x) - 1)}{(\ln(x))^2}$
13. $f_{13}'(x) = \dfrac{x}{\sqrt{x^2 + 1}}$
14. $f_{14}'(x) = -\dfrac{2x+3}{(x^2 + 3x + 2)^2}$
15. $f_{15}'(x) = 2x\ln(x) + x$
16. $f_{16}'(x) = \dfrac{-2}{x^2 - 1}$
17. $f_{17}'(x) = -\dfrac{3x^2 + 1}{(x^3 + x)^2}$
18. $f_{18}'(x) = \sin(e^{-x})e^{-x}$
19. $f_{19}'(x) = \dfrac{\cos(\ln x)}{x}$
20. $f_{20}'(x) = \dfrac{2x}{x^2 + 1}$
21. $f_{21}'(x) = \dfrac{e^{2x}(2x - 1)}{x^2}$

22. $f_{22}'(x) = -\dfrac{x}{(x^2 + 1)^{3/2}}$
23. $f_{23}'(x) = \dfrac{2x}{1 + x^4}$
24. $f_{24}'(x) = 3x^2 \cos(x^3)$
25. $f_{25}'(x) = \dfrac{1}{x-3} + \dfrac{2}{1-2x}$
 $= \dfrac{-5}{(x-3)(1-2x)}$
26. $f_{26}'(x) = e^{\sin(x)}\cos(x)$
27. $f_{27}'(x) = \dfrac{\cos(x)\sin(x)}{\sqrt{1 + \cos^2(x)}}$
28. $f_{28}'(x) = \dfrac{4}{(x^2 + 4)^{3/2}}$
29. $f_{29}'(x) = \dfrac{1}{2\sqrt{x}\cos^2(\sqrt{x})}$
30. $f_{30}'(x) = \dfrac{x\,e^{\sqrt{1+x^2}}}{\sqrt{1 + x^2}}$

Exercice 2
Dérivez :

1. $f_1 : x \longmapsto 4e^x - 2\ln(x)$
2. $f_2 : x \longmapsto e^{4x} - \ln(2x)$
3. $f_3 : x \longmapsto \dfrac{\cos(x) + 1}{4}$
4. $f_4 : x \longmapsto \dfrac{2}{x^4}$
5. $f_5 : x \longmapsto \dfrac{x^5}{\ln(x)}$

6. $f_6 : x \longmapsto \sqrt{x^2 + 1}$
7. $f_7 : x \longmapsto \ln\left(\dfrac{x+1}{x-1}\right)$
8. $f_8 : x \longmapsto \dfrac{1}{x^3 + x}$
9. $f_9 : x \longmapsto \cos(e^{-x})$
10. $f_{10} : x \longmapsto \sin(\ln(x))$
11. $f_{11} : x \longmapsto \dfrac{1}{\sqrt{x^2 + 1}}$

12. $f_{12} : x \longmapsto \arctan(x^2)$
13. $f_{13} : x \longmapsto \ln\left(\dfrac{x-3}{1-2x}\right)$
14. $f_{14} : x \longmapsto \sqrt{1 + \cos^2(x)}$
15. $f_{15} : x \longmapsto \dfrac{x}{\sqrt{x^2 + 4}}$
16. $f_{16} : x \longmapsto \tan(\sqrt{x})$

Corrigé :

1. $f_1'(x) = 4e^x - \dfrac{2}{x}$
2. $f_2'(x) = 4e^{4x} - \dfrac{1}{x}$
3. $f_3'(x) = -\dfrac{\sin(x)}{4}$
4. $f_4'(x) = -\dfrac{8}{x^5}$
5. $f_5'(x) = \dfrac{x^4(5\ln(x) - 1)}{(\ln(x))^2}$
6. $f_6'(x) = \dfrac{x}{\sqrt{x^2 + 1}}$

7. $f_7'(x) = \dfrac{-2}{x^2 - 1}$
8. $f_8'(x) = -\dfrac{3x^2 + 1}{(x^3 + x)^2}$
9. $f_9'(x) = \sin(e^{-x})e^{-x}$
10. $f_{10}'(x) = \dfrac{\cos(\ln x)}{x}$
11. $f_{11}'(x) = -\dfrac{x}{(x^2 + 1)^{3/2}}$
12. $f_{12}'(x) = \dfrac{2x}{1 + x^4}$

13. $f_{13}'(x) = \dfrac{1}{x-3} + \dfrac{2}{1-2x}$
    $= \dfrac{-5}{(x-3)(1-2x)}$
14. $f_{14}'(x) = \dfrac{\cos(x)\sin(x)}{\sqrt{1 + \cos^2(x)}}$
15. $f_{15}'(x) = \dfrac{4}{(x^2 + 4)^{3/2}}$
16. $f_{16}'(x) = \dfrac{1}{2\sqrt{x}\cos^2(\sqrt{x})}$