Exercicis de derivació (II).

1. $f(x) = x^4 + 3x^2 - 6$

2. $f(x) = 6x^3 - x^2$

3. $f(x) = \dfrac{x^3 - x^2 + 1}{5}$

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

5. $f(x) = \sqrt{3x} + \sqrt[3]{x} + \dfrac{1}{x}$

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

7. $f(x) = \sqrt[3]{x^2} - 2\sqrt{x} + 5$

8. $f(x) = \left(1 + 4x^3\right)\left(1 + 2x^2\right)$

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

10. $f(x) = \left(2x - 1\right)\left(x^2 - 6x + 3\right)$

11. $f(t) = \dfrac{t^3}{1 + t^2}$

12. $f(s) = \dfrac{(s + 4)^2}{s + 3}$

13. $f(x) = \dfrac{x^3 + 1}{x^2 - x - 2}$

14. $f(x) = \left(2x^2 - 3\right)^2$

15. $f(x) = \sqrt{\dfrac{1 + x}{1 - x}}$

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

17. $f(x) = \sqrt[3]{x^2 + x + 1}$

18. $f(x) = \left(1 + \sqrt[3]{x}\right)^3$

19. $f(x) = \sin^2 x$

20. $f(x) = 2\sin x + \cos 3x$

21. $f(x) = \dfrac{\sin x}{1 + \cos x}$

22. $f(x) = \sin 2x \cos 3x$

23. $f(t) = t \sin t + \cos t$

24. $f(t) = \sin^3 t \cos t$

25. $f(x) = \ln \cos x$

26. $f(x) = \ln \tan x$

27. $f(x) = \ln \sin^2 x$

28. $f(x) = \dfrac{\tan x - 1}{\sec x}$

29. $f(x) = \ln \sqrt{\dfrac{1 + \sin x}{1 - \sin x}}$

30. $f(x) = \sin(\ln x)$

31. $f(x) = \sin(\cos x)$

32. $f(x) = \ln \dfrac{1 + x}{1 - x}$

33. $f(x) = \log_3\left(x^2 - \sin x\right)$

34. $f(x) = \ln \dfrac{1 + x^2}{1 - x^2}$

35. $f(x) = \ln(x^2 + x)$

36. $f(x) = \ln(x^3 - 2x + 5)$

37. $f(x) = x \ln x$

38. $f(x) = \ln^3 x$

39. $f(x) = \ln\left(x + \sqrt{1 + x^2}\right)$

40. $f(x) = \ln(\ln x)$

41. $f(x) = e^{(4x + 5)}$

42. $f(x) = a^{x^2}$

43. $f(x) = 7^{\left(x^2 + 2x\right)}$

44. $f(x) = e^x(1 - x^2)$

45. $f(x) = \dfrac{e^x - 1}{e^x + 1}$

46. $f(x) = e^{\sin x}$

47. $f(x) = e^{\cos x} \sin x$

48. $f(x) = e^x \ln(\sin x)$

49. $f(x) = x^x$

50. $f(x) = e^{x^x}$

Solucions:

1. $f(x) = x^4 + 3x^2 - 6$ $f'(x) = 4x^3 + 6x$

2. $f(x) = 6x^3 - x^2$ $f'(x) = 18x^2 - 2x$

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

4. $f(x) = 6x^{\frac{7}{2}} + 4x^{\frac{5}{2}} + 2x$ $f(x) = 21x^{\frac{5}{2}} + 10x^{\frac{3}{2}} + 2$

5. $f(x) = \sqrt{3x} + \sqrt[3]{x} + \dfrac{1}{x}$ $f'(x) = \dfrac{\sqrt{3}}{2\sqrt{x}} + \dfrac{1}{3\sqrt[3]{x^2}} - \dfrac{1}{x^2}$

6. $f(x) = \dfrac{(x+1)^3}{x^{\frac{3}{2}}}$ $f'(x) = \dfrac{3(x+1)^2(x-1)}{2x^{\frac{5}{2}}}$

7. $f(x) = \sqrt[3]{x^2} - 2\sqrt{x} + 5$ $f'(x) = \dfrac{2}{3}\dfrac{1}{\sqrt[3]{x}} - \dfrac{1}{\sqrt{x}}$

8. $f(x) = (1 + 4x^3)(1 + 2x^2)$ $f'(x) = 4x(1 + 3x + 10x^3)$

9. $f(x) = x(2x - 1)(3x + 2)$ $f'(x) = 2(9x^2 + x - 1)$

10. $f(x) = (2x - 1)(x^2 - 6x + 3)$ $f'(x) = 6x^2 - 26x + 12$

11. $f(t) = \dfrac{t^3}{1 + t^2}$ $f'(t) = \dfrac{t^2(3 + t^2)}{(1 + t^2)^2}$

12. $f(s) = \dfrac{(s + 4)^2}{s + 3}$ $f'(s) = \dfrac{(s + 2)(s + 4)}{(s + 3)^2}$

13. $f(x) = \dfrac{x^3 + 1}{x^2 - x - 2}$ $f'(x) = \dfrac{x^4 - 2x^3 - 6x^2 - 2x + 1}{(x^2 - x - 2)^2}$

14. $f(x) = (2x^2 - 3)^2$ $f'(x) = 8x(2x^2 - 3)$

15. $f(x) = \sqrt{\dfrac{1 + x}{1 - x}}$ $f'(x) = \dfrac{1}{(1 - x)\sqrt{1 - x}}$

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

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

18. $f(x) = \left(1 + \sqrt[3]{x}\right)^3$ $\qquad$ $f'(x) = \left(1 + \dfrac{1}{\sqrt[3]{x}}\right)^2$

19. $f(x) = \sin^2 x$ $\qquad$ $f'(x) = \sin 2x$

20. $f(x) = 2\sin x + \cos 3x$ $\qquad$ $f'(x) = 2\cos x - 3\sin 3x$

21. $f(x) = \dfrac{\sin x}{1 + \cos x}$ $\qquad$ $f'(x) = \dfrac{1}{1 + \cos x}$

22. $f(x) = \sin 2x \cos 3x$ $\qquad$ $f'(x) = 2\cos 2x \cos 3x - 3\sin 2x \sin 3x$

23. $f(t) = t \sin t + \cos t$ $\qquad$ $f'(t) = t \cos t$

24. $f(t) = \sin^3 t \cos t$ $\qquad$ $f'(t) = \sin^2 t\left(3\cos^2 t - \sin^2 t\right)$

25. $f(x) = \ln \cos x$ $\qquad$ $f'(x) = -\tan x$

26. $f(x) = \ln \tan x$ $\qquad$ $f'(x) = \dfrac{2}{\sin 2x}$

27. $f(x) = \ln \sin^2 x$ $\qquad$ $f'(x) = 2\cot x$

28. $f(x) = \dfrac{\tan x - 1}{\sec x}$ $\qquad$ $f'(x) = \sin x + \cos x$

29. $f(x) = \ln\sqrt{\dfrac{1 + \sin x}{1 - \sin x}}$ $\qquad$ $f'(x) = \dfrac{1}{\cos x}$

30. $f(x) = \sin(\ln x)$ $\qquad$ $f'(x) = \dfrac{\cos(\ln x)}{x}$

31. $f(x) = \sin(\cos x)$ $\qquad$ $f'(x) = -\sin x \cos(\cos x)$

32. $f(x) = \ln\dfrac{1 + x}{1 - x}$ $\qquad$ $f'(x) = \dfrac{2}{1 - x^2}$

33. $f(x) = \log_3\left(x^2 - \sin x\right)$ $\qquad$ $f'(x) = \dfrac{2x - \cos x}{\left(x^2 - \sin x\right)\ln 3}$

34. $f(x) = \ln\dfrac{1 + x^2}{1 - x^2}$ $\qquad$ $f'(x) = \dfrac{4x}{1 - x^4}$

35. $f(x) = \ln(x^2 + x)$ $\qquad$ $f'(x) = \dfrac{2x + 1}{x^2 + x}$

36. $f(x) = \ln(x^3 - 2x + 5)$ $f'(x) = \dfrac{3x^2 - 2}{x^3 - 2x + 5}$

37. $f(x) = x \ln x$ $f'(x) = \ln x + 1$

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

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

40. $f(x) = \ln(\ln x)$ $f'(x) = \dfrac{1}{x \ln x}$

41. $f(x) = e^{(4x+5)}$ $f'(x) = 4e^{(4x+5)}$

42. $f(x) = a^{x^2}$ $f'(x) = 2xa^{x^2} \ln a$

43. $f(x) = 7^{\left(x^2 + 2x\right)}$ $f'(x) = 2(x+1)7^{\left(x^2 + 2x\right)} \ln 7$

44. $f(x) = e^x(1 - x^2)$ $f'(x) = e^x(1 - 2x - x^2)$

45. $f(x) = \dfrac{e^x - 1}{e^x + 1}$ $f'(x) = \dfrac{2e^x}{\left(e^x + 1\right)^2}$

46. $f(x) = e^{\sin x}$ $f'(x) = e^{\sin x} \cos x$

47. $f(x) = e^{\cos x} \sin x$ $f'(x) = e^{\cos x}\!\left(\cos x - \sin^2 x\right)$

48. $f(x) = e^x \ln(\sin x)$ $f'(x) = e^x(\cot x + \ln(\sin x))$

49. $f(x) = x^x$ $f'(x) = x^x(1 + \ln x)$

50. $f(x) = e^{x^x}$ $f'(x) = e^{x^x}(1 + \ln x)x^x$