DERIVADAS

Calcula la derivada de cada una de las siguientes funciones:

1. $f(x) = (x^2 - 5x + 6)^4$

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

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

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

5. $f(x) = 3x - \sqrt[3]{x^2 - 9}$

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

7. $f(x) = \dfrac{x}{\sqrt{4 - x^2}}$

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

9. $f(x) = \operatorname{Ln} x^3$

10. $f(x) = \operatorname{Ln}\left(\dfrac{e^x}{1 - e^x}\right)$

11. $f(x) = e^{x^4}$

12. $f(x) = 2^{\operatorname{Ln}(\cos x)}$

13. $f(x) = \sqrt{e^{x^2}}$

14. $f(x) = \operatorname{sen} 2x$

15. $f(x) = \sqrt{\operatorname{sen} x}$

16. $f(x) = \cos e^x$

17. $f(x) = \operatorname{cotg} x$

18. $f(x) = \sec x$

19. $f(x) = \operatorname{cosec} x$

20. $f(x) = \cos^5 3x$

21. $f(x) = \operatorname{cosec} x^7$

22. $f(x) = \arccos \sqrt{x}$

23. $f(x) = \operatorname{arctg} (\operatorname{Ln} x)$

24. $f(x) = \operatorname{tg}^3 5x$

25. $f(x) = \sec^5 7x$

26. $f(x) = \arccos a^x$

27. $f(x) = \operatorname{cotg} (\operatorname{sen} x)$

28. $f(x) = \operatorname{tg} \sqrt{x^2 - 1}$

29. $f(x) = a^{\sqrt{\frac{x+1}{x-1}}}$

30. $f(x) = \operatorname{Ln}\left(\dfrac{\operatorname{Ln} x}{x}\right)$

31. $f(x) = \sqrt{e^{(x^2 - 1)}}$

32. $f(x) = \operatorname{sen} \sqrt{1 + e^x}$

33. $f(x) = \operatorname{Ln} (x \cdot e^{x^2})$

34. $f(x) = a^x \cdot x^a$

35. $f(x) = 5^x \cdot e^{2x}$

36. $f(x) = e^x \cdot \operatorname{Ln} x$

37. $f(x) = \operatorname{Ln} [(\operatorname{Ln} x)^3]$

38. $f(x) = \operatorname{Ln} (\operatorname{sen} x^2)$

39. $f(x) = \operatorname{sen} (\operatorname{arcsen} x)$

40. $f(x) = e^{\operatorname{cosec} x}$

41. $f(x) = \operatorname{Ln} (\operatorname{tg}^2 3x)$

42. $f(x) = e^{\operatorname{arctg} (x + 1)}$

43. $f(x) = \operatorname{sen} [\operatorname{arctg} (x^2 + 1)]$

44. $f(x) = \operatorname{Ln} [\arccos (\operatorname{sen} x)]$

45. $f(x) = \operatorname{Ln} (\cos x) + x \cdot e^{2x}$

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

47. $f(x) = x^{\operatorname{Ln} x}$

48. $f(x) = (\operatorname{sen} x)^x$

49. $f(x) = x^{\operatorname{sen} x}$

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

51. $f(x) = (\operatorname{arctg} x)^x$

Solución:

1. $f'(x) = 4\,(x^2 - 5x + 6)^3\,(2x - 5)$

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

3. $f'(x) = 10x^4 - 3x^2$

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

5. $f'(x) = 3 - \dfrac{2x}{3\sqrt[3]{(x^2 - 9)^2}}$

6. $f'(x) = 6x\,\sqrt{1 - 5x^2} - \dfrac{15x^3 + 10x}{\sqrt{1 - 5x^2}}$

7. $f'(x) = \dfrac{4}{\left(\sqrt{4 - x^2}\right)^3}$

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

9. $f'(x) = \dfrac{3}{x}$

10. $f'(x) = \dfrac{1}{1 - e^x}$

11. $f'(x) = 4x^3\,e^{x^4}$

12. $f'(x) = -2^{\text{Ln}(\cos x)} \cdot \text{tg}\,x \cdot \text{Ln}\,2$

13. $f'(x) = \dfrac{x \cdot e^{x^2}}{\sqrt{e^{x^2}}}$

14. $f'(x) = 2\cos 2x$

15. $f'(x) = \dfrac{\cos x}{2\sqrt{\text{sen}\,x}}$

16. $f'(x) = -e^x \cdot \text{sen}\,e^x$

17. $f'(x) = -1 - \cot g^2 x = -\text{cosec}^2 x$

18. $f'(x) = \text{sen}\,x \cdot \sec^2 x$

19. $f'(x) = -\cos x \cdot \text{cosec}^2 x$

20. $f'(x) = -15x \cdot \cos^4 3x \cdot \text{sen}\,3x$

21. $f'(x) = -7x^6 \cdot \cos x^7 \cdot \text{cosec}^2 x^7$

22. $f'(x) = \dfrac{-1}{2\sqrt{x} \cdot \sqrt{1 - x}}$

23. $f'(x) = \dfrac{1}{x \cdot \left(1 + (Ln\,x)^2\right)}$

24. $f'(x) = 15\,\text{tg}^2\,5x \cdot (1 + \text{tg}^2\,5x)$

25. $f'(x) = 35\,\text{sen}\,7x \cdot \sec^6 7x$

26. $f'(x) = \dfrac{-a^x \cdot \text{Ln}\,a}{\sqrt{1 - a^{2x}}}$

27. $f'(x) = -(\cos x) \cdot [\text{cosec}^2\,(\text{sen}\,x)]$

28. $f'(x) = \dfrac{x \cdot (1 + \text{tg}^2\sqrt{x^2 - 1})}{\sqrt{x^2 - 1}}$

29. $f'(x) = \dfrac{-a^{\sqrt{\frac{x+1}{x-1}}} \cdot \text{Ln}\,a}{\sqrt{(x+1) \cdot (x-1)^3}}$

30. $f'(x) = \dfrac{1 - \text{Ln}\,x}{x \cdot \text{Ln}\,x}$

31. $f'(x) = x \cdot \sqrt{e^{(x^2 - 1)}}$

32. $f'(x) = \dfrac{e^x \cdot \cos\sqrt{1 + e^x}}{2\sqrt{1 + e^x}}$

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

34. $f'(x) = a^x \cdot x^{a-1} \cdot (x \cdot \text{Ln}\,a + a)$

35. $f'(x) = 5^x \cdot e^{2x} \cdot (2 + \text{Ln}\,5)$

36. $f'(x) = e^x \cdot \left(\text{Ln}\,x + \dfrac{1}{x}\right)$

37. $f'(x) = \dfrac{3}{x \cdot \text{Ln}\,x}$

38. $f'(x) = 2x \cdot \cot g\,x^2$

39. $f'(x) = \dfrac{\cos(\arcsin x)}{\sqrt{1 - x^2}}$

40. $f'(x) = -\cos x \cdot \text{cosec}^2 x \cdot e^{\text{cosec}\,x}$

41. $f'(x) = 6\,(\cot g\,3x + \text{tg}\,3x)$

42. $f'(x) = \dfrac{e^{\text{arctg}(x+1)}}{1 + (x+1)^2}$

43. $f'(x) = \dfrac{2x \cdot \cos\left(\text{arctg}\,(x^2 + 1)\right)}{1 + (x^2 + 1)^2}$

44. $f'(x) = -1/\arccos(\text{sen}\,x)$

45. $f'(x) = -\text{tg}\,x + e^{2x} \cdot (1 + 2x)$

46. $f'(x) = x^x \cdot [\text{Ln}\,x + 1]$

47. $f'(x) = (x^{\,\text{Ln}\,x}) \cdot 2\,\text{Ln}\,x/x$

48. $f'(x) = (\text{sen}\,x)^x \cdot [\text{Ln}(\text{sen}\,x) + x \cdot \cot g\,x]$

49. $f'(x) = x^{\,\text{sen}\,x} \cdot [\cos x \cdot \text{Ln}\,x + \dfrac{\text{sen}\,x}{x}]$

50. $f'(x) = x^{e^x} \cdot e^x \cdot [\text{Ln}\,x + (1/x)]$

51. $f'(x) = (\text{arctg}\,x)^x \left[\text{Ln}(\text{arctg}x) + \dfrac{x}{\left(1 + x^2\right) \cdot \text{arctg}x}\right]$