DERIVADAS (con soluciones)

Solución:

1. $f(x) = \dfrac{3}{2}x^3 + \dfrac{2}{5}x^2 - \dfrac{4}{7}x - 5$ $\qquad$ $f'(x) = \dfrac{9}{2}x^2 + \dfrac{4}{5}x - \dfrac{4}{7}$

2. $f(x) = x \cdot (x+2)$ $\qquad$ $f'(x) = 2x + 2$

3. $f(x) = x^2 \cdot (7 - 2x)$ $\qquad$ $f'(x) = -6x^2 + 14x$

4. $f(x) = (2x - 5) \cdot (4 - 3x)$ $\qquad$ $f'(x) = -12x + 23$

5. $f(x) = (-x^4 - 2) \cdot (5x - 7x^2)$ $\qquad$ $f'(x) = 42x^5 - 25x^4 + 28x - 10$

6. $f(x) = (3x^4 - 3x^2 + 5)^4$ $\qquad$ $f'(x) = (3x^4 - 3x^2 + 5)^3 \cdot \left(48x^3 - 24x\right)$

7. $f(x) = (1 - 2x + 3x^2 - 4x^3)^5$ $\qquad$ $f'(x) = (1 - 2x + 3x^2 - 4x^3)^4 \cdot \left(-60x^2 + 30x - 10\right)$

8. $f(x) = \dfrac{2x + 5}{3}$ $\qquad$ $f'(x) = \dfrac{2}{3}$

9. $f(x) = \dfrac{2}{x - 3}$ $\qquad$ $f'(x) = \dfrac{-2}{(x - 3)^2}$

10. $f(x) = \dfrac{4}{x^2}$ $\qquad$ $f'(x) = \dfrac{-8}{x^3}$

11. $f(x) = \dfrac{2x - 3}{3 - x}$ $\qquad$ $f'(x) = \dfrac{3}{(3 - x)^2}$

12. $f(x) = 6x^5 - 3x^4$ $\qquad$ $f'(x) = 30x^4 - 12x^3$

13. $f(x) = (3 - 4x - 5x^2)^4$ $\qquad$ $f'(x) = (3 - 4x - 5x^2)^3 \cdot \left(-16 - 40x\right)$

14. $f(x) = \dfrac{x^8}{9} - \dfrac{x^5}{3}$ $\qquad$ $f'(x) = \dfrac{8x^7}{9} - \dfrac{5x^4}{3}$

15. $f(x) = \left(x^2 - 1\right)^3 \cdot \left(2x^2 - 3x + 2\right)^3$ $\qquad$ $f'(x) = \left(x^2 - 1\right)^2 \cdot \left(2x^2 - 3x + 2\right)^2 \cdot \left(16x^3 - 21x^2 + 8x + 3\right)$

16. $f(x) = \dfrac{x^2 + 5}{x^2 + 6}$ $\qquad$ $f'(x) = \dfrac{2x}{\left(x^2 + 6\right)^2}$

17. $f(x) = \dfrac{x^4 - 3x^2 + 7x}{2x + 5}$ $\qquad$ $f'(x) = \dfrac{6x^4 + 20x^3 - 6x^2 - 30x + 35}{\left(2x + 5\right)^2}$

18. $f(x) = \dfrac{(2x + 3)^3}{(3x^2 - 2x + 6)^2}$ $\qquad$ $f'(x) = \dfrac{(2x + 3)^2 \cdot \left(-6x^2 - 40x + 48\right)}{(3x^2 - 2x + 6)^3}$

19. $f(x) = \sqrt{x}$ $\qquad$ $f'(x) = \dfrac{1}{2\sqrt{x}}$

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

21. $f(x) = \sqrt[4]{x - 5}$ $\qquad$ $f'(x) = \dfrac{1}{4\sqrt[4]{(x - 5)^3}}$

22. $f(x) = \sqrt{3x} - \sqrt{3 - x}$ $\qquad$ $f'(x) = \dfrac{3}{2\sqrt{3x}} + \dfrac{1}{2\sqrt{3 - x}}$

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

Solución:

$f'(x) = \dfrac{4x^4 - 12x^3 + 49x^2 - 20x - 24}{\left(2x^2 - 3x + 6\right)^2}$

24. $f(x) = \dfrac{2x - 5x^2 + x^3}{(2x - 8)\cdot(3x - 4)}$

$f'(x) = \dfrac{32 - 160x + 122x^2 - 32x^3 + 3x^4}{(2x - 8)^2 \cdot (3x - 4)^2}$

25. $f(x) = 2\sqrt[5]{x^4 - 1}$

$f'(x) = \dfrac{8}{5}\cdot x^3 \cdot \left(x^4 - 1\right)^{-\frac{4}{5}}$

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

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

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

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

28. $f(x) = sen\,(5x - 3)$

$f'(x) = 5\cdot\cos\,(5x - 3)$

29. $f(x) = \cos 3^x$

$f'(x) = -\,sen\,3^x \cdot 3^x \cdot Ln\,3$

30. $f(x) = Ln\,(7x + 2)$

$f'(x) = \dfrac{7}{7x + 2}$

31. $f(x) = \cos\,(4 - 9x^2)$

$f'(x) = 18\cdot x\cdot sen\,(4 - 9x^2)$

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

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

33. $f(x) = x\cdot\sqrt{3x^2 - 1}$

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

34. $f(x) = \sqrt[3]{Ln\,x}$

$f'(x) = \dfrac{1}{3x}\cdot\left(Ln\,x\right)^{-\frac{2}{3}}$

35. $f(x) = sen\,\dfrac{3}{x^2}$

$f'(x) = \cos\dfrac{3}{x^2}\cdot\left(\dfrac{-6}{x^3}\right)$

36. $f(x) = \sqrt[4]{2^x}$

$f'(x) = 2^{\frac{x}{4}}\cdot Ln\,2\cdot(1/4)$

37. $f(x) = \cos\sqrt[5]{3x}$

$f'(x) = -\,sen\sqrt[5]{3x}\cdot\left(3x\right)^{-\frac{4}{5}}\cdot(3/5)$

38. $f(x) = Ln\,(x^2 + 7)$

$f'(x) = \dfrac{2x}{x^2 + 7}$

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

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

40. $f(x) = x\cdot e^x$

$f'(x) = (x + 1)\cdot e^x$

41. $f(x) = Ln\left(\dfrac{2 - 5x^2}{4}\right)$

$f'(x) = \dfrac{-40x}{2 - 5x^2}$

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

$f'(x) = \dfrac{5}{3}\cdot x^{\frac{2}{3}}$

43. $f(x) = e^{\left(3x^4 - 5x\right)^2}$

$f'(x) = e^{\left(3x^4 - 5x\right)^2}\cdot\left(3x^4 - 5x\right)\cdot\left(24x^3 - 10\right)$

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

Solución: $f'(x) = \dfrac{-1}{x^2} + 15 \cdot (5x-2)^2$

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

$f'(x) = \dfrac{2x^2 - 10x + 15}{(2x-5)^2}$

46. $f(x) = 3^{5x^2 - 4x}$

$f'(x) = 3^{5x^2 - 4x} \cdot (10x - 4)$

47. $f(x) = 3^{5x} + e^x$

$f'(x) = 3^{5x} \cdot 5 \cdot Ln\, 3 + e^x$

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

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

49. $f(x) = (x^2 + 2) \cdot Ln(x^2 + 2)$

$f'(x) = 2x \cdot [1 + Ln(x^2 + 2)]$

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

$f'(x) = \dfrac{-1}{x^2} + 15 \cdot (5x-2)^2$

51. $f(x) = \dfrac{(3x^5 + 4)^3}{5x^3 - x}$

$f'(x) = \dfrac{(3x^5 + 4)^2 \cdot (180x^7 - 42x^5 - 60x^2 + 4)}{(5x^3 - x)^2}$

52. $f(x) = sen\,(x^2 - 1) + \cos 3x$

$f'(x) = 2 \cdot x \cdot \cos(x^2 - 1) - 3 \cdot sen\, 3x$

53. $f(x) = Ln\left(\dfrac{x}{x-1}\right)$

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

54. $f(x) = \sqrt{sen\,(3x^4 - 2x)}$

$f'(x) = \dfrac{(6x^3 - 2) \cdot \cos(3x^4 - 2x)}{\sqrt{sen\,(3x^4 - 2x)}}$

55. $f(x) = \dfrac{1}{sen\, 3x}$

$f'(x) = \dfrac{-3 \cdot \cos 3x}{(sen\, 3x)^2}$

56. $f(x) = (\cos 2x)^3 - e^{2x-1}$

$f'(x) = -6 \cdot sen\, 2x \cdot (\cos 2x)^2 - 2 \cdot e^{2x-1}$

57. $f(x) = \dfrac{e^{x-1}}{sen\, x}$

$f'(x) = \dfrac{e^{x-1} \cdot (sen\, x - \cos x)}{(sen\, x)^2}$

58. $f(x) = \sqrt[3]{Ln\,(x^2 - 1)}$

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

59. $f(x) = \sqrt[3]{2x - 1}$

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

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

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

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

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

62. $f(x) = (3x - 1) \cdot 2^{x-1}$

$f'(x) = (3 + 3 \cdot Ln\, 2 \cdot x - Ln\, 2) \cdot 2^{x-1}$

63. $f(x) = \log_2\,(x^3 - 2x + 1)$

$f'(x) = \dfrac{3x^2 - 2}{Ln\, 2 \cdot (x^3 - 2x + 1)}$

64. $f(x) = \log \dfrac{x}{x-1}$

$f'(x) = \dfrac{-1}{Ln\, 10 \cdot x \cdot (x-1)}$