2.4 EJERCICIOS DE RECAPITULACIÓN

Halla la derivada de las siguientes funciones:

1. $f(x) = \frac{x^3}{3} - \frac{x^2}{4} + \frac{2}{3} \rightarrow f'(x) =$
2. $f(x) = \frac{x^5}{3} - \frac{2}{x^2} + 3 \rightarrow f'(x) =$
3. $f(x) = \frac{x^2 - 2x + 1}{5} \rightarrow f'(x) =$
4. $f(x) = (3x - 2)\, e^x \rightarrow f'(x) =$
5. $f(x) = \sqrt{x} - \frac{2}{x^3} + \sqrt{5} \rightarrow f'(x) =$
6. $f(x) = \frac{1}{x} - \frac{\sqrt[3]{x}}{3} + 2x^2 \rightarrow f'(x) =$
7. $f(x) = \frac{\sqrt[3]{x}}{x^2} - \frac{x^2 - 1}{3} \rightarrow f'(x) =$
8. $f(x) = \frac{x^3 - 3x^4 + 2x + 1}{x} \rightarrow f'(x) =$
9. $f(x) = \frac{3}{2x^2} - \frac{2x^2}{3} + ln\, 5 \rightarrow f'(x) =$
10. $f(x) = \sqrt{\frac{2}{x^3}} - \frac{x^2}{3} + \sqrt{2} \rightarrow f'(x) =$
11. $f(x) = \frac{2\sqrt{3}}{4} + \frac{3\, ln\, x}{2} \rightarrow f'(x) =$
12. $f(x) = sen\, x \cdot cos\, x \rightarrow f'(x) =$
13. $f(x) = \frac{e^x}{x^2 - 1} \rightarrow f'(x) =$
14. $f(x) = \frac{x^2 - 1}{2x + 1} \rightarrow f'(x) =$
15. $f(x) = (x^2 - 1)\, e^x - ln\, x \rightarrow f'(x) =$
16. $f(x) = 2^x - 3\, tg\, x \rightarrow f'(x) =$
17. $f(x) = x^3\, e^x + x^2\, sen\, x \rightarrow f'(x) =$
18. $f(x) = \frac{x - 1}{3x - 2} \rightarrow f'(x) =$
19. $f(x) = \frac{\sqrt{x}}{sen\, x} \rightarrow f'(x) =$

20 $f(x) = (x^2 - 1)^4 \rightarrow f'(x) =$

21 $f(x) = \left(\frac{x-1}{x+2}\right)^3 \rightarrow f'(x) =$

22 $f(x) = \frac{2x-1}{(x+1)^2} \rightarrow f'(x) =$

23 $f(x) = \frac{x+1}{(x-1)^3} \rightarrow f'(x) =$

24 $f(x) = ln\left(\frac{x-1}{x+4}\right) \rightarrow f'(x) =$

25 $f(x) = \cos^2(3x-2) \rightarrow f'(x) =$

26 $f(x) = \sqrt{sen\, x} \rightarrow f'(x) =$

27 $f(x) = ln(sen\, x^2) \rightarrow f'(x) =$

28 $f(x) = e^{4x-1} \cdot sen(3x^2) \rightarrow f'(x) =$

29 $f(x) = 2^{4x^2-1} \cdot ln(8x) \rightarrow f'(x) =$

30 $f(x) = \frac{(2x+3)^2}{1-x} \rightarrow f'(x) =$

31 $f(x) = tg\left(\frac{2}{x-3}\right) \rightarrow f'(x) =$

32 $f(x) = \frac{e^{5x+1}}{x+2} \rightarrow f'(x) =$

33 $f(x) = \frac{ln^2 x}{x} \rightarrow f'(x) =$

34 $f(x) = \frac{x\,e^x}{x+2} \rightarrow f'(x) =$

35 $f(x) = \frac{\sqrt{x-1}}{3x+4} \rightarrow f'(x) =$

36 $f(x) = \sqrt{\frac{3x+1}{x+2}} \rightarrow f'(x) =$

37 $f(x) = arc\,tg(x^2+2) \rightarrow f'(x) =$

38 $f(x) = \sqrt{arc\,tg\, x} \rightarrow f'(x) =$

39 $f(x) = \frac{3\,arc\,sen(2x-1)}{4} \rightarrow f'(x) =$

40 $f(x) = arc\cos(\sqrt{x}) \rightarrow f'(x) =$

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

2. $f'(x) = \frac{5x^4}{3} + \frac{4}{x^3}$

3. $f'(x) = \frac{2x - 2}{5}$

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

5. $f'(x) = \frac{1}{2\sqrt{x}} + \frac{6}{x^4}$

6. $f'(x) = \frac{-1}{x^2} - \frac{1}{9\sqrt[3]{x^4}} + 4x$

7. $f'(x) = \frac{-5}{3\sqrt[3]{x^8}} - \frac{2x}{3}$

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

   $f'(x) = 2x - 9x^2 - \frac{1}{x^2}$

9. $f'(x) = \frac{-3}{x^3} - \frac{4x}{3}$

10. $f'(x) = \frac{-3\sqrt{2}}{2\sqrt{x^5}} - \frac{2x}{3}$

11. $f'(x) = \frac{3}{2x}$

12. $f'(x) = \cos^2 x - \operatorname{sen}^2 x$

13. $f'(x) = \frac{e^x(x^2 - 1) - e^x \cdot 2x}{(x^2 - 1)^2} = \frac{(x^2 - 2x - 1)\,e^x}{(x^2 - 1)^2}$

14. $f'(x) = \frac{2x(2x + 1) - (x^2 - 1) \cdot 2}{(2x + 1)^2} = \frac{2x^2 + 2x + 2}{(2x + 1)^2}$

15. $f'(x) = 2x\,e^x + (x^2 - 1)\,e^x - \frac{1}{x} =$

    $= (x^2 + 2x - 1)\,e^x - \frac{1}{x}$

16. $f'(x) = 2^x \cdot \ln 2 - 3(1 + \operatorname{tg}^2 x) =$

    $= 2^x \cdot \ln 2 - 3 - 3\operatorname{tg}^2 x$

17. $f'(x) = 3x^2 e^x + x^3 e^x + 2x \operatorname{sen} x + x^2 \cos x$

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

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

$= \dfrac{sen\ x - 2x\ cos\ x}{2\sqrt{x}\ sen^2\ x}$

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$f'(x) = 4\ (x^2 - 1)^3 \cdot 2x = 8x\ (x^2 - 1)^3$

$f'(x) = 3\left(\dfrac{x-1}{x+2}\right)^2 \cdot \dfrac{3}{(x+2)^2} = \dfrac{9\ (x-1)^2}{(x+2)^4}$

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

$= \dfrac{(x+1) \cdot (2x + 2 - 4x + 2)}{(x+1)^4} = \dfrac{-2x+4}{(x+1)^3}$

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

$= \dfrac{(x-1)^2\ (x - 1 - 3x - 3)}{(x-1)^6} = \dfrac{-2x-4}{(x-1)^4}$

$f'(x) = \dfrac{1}{\frac{x-1}{x+4}} \cdot \dfrac{5}{(x+4)^2} = \dfrac{(x+4)}{(x-1)} \cdot \dfrac{5}{(x+4)^2} =$

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

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

$= -6\ cos\ (3x-2)\ sen\ (3x-2)$

$f'(x) = \dfrac{cos\ x}{2\sqrt{sen\ x}}$

$f'(x) = \dfrac{2x\ cos\ x^2}{sen\ x^2}$

$f'(x) = e^{4x-1} \cdot 4\ sen(3x^2) + e^{4x-1} \cdot cos(3x^2)\ 6x =$

$= 4e^{4x-1}\ sen\ (3x^2) + 6x\ e^{4x-1}\ cos\ (3x^2)$

$f'(x) = 2^{4x^2-1} \cdot ln\ 2 \cdot 8x \cdot ln\ (8x) + 2^{4x^2-1} \cdot \dfrac{8}{8x} =$

$= 2^{4x^2-1} \cdot ln\ 2 \cdot 8x \cdot ln\ (8x) + \dfrac{2^{4x^2-1}}{x}$

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

$= \dfrac{(2x+3)\ (-2x+7)}{(1-x)^2} = \dfrac{-4x^2 + 8x + 21}{(1-x)^2}$

$f'(x) = \left[1 + tg^2\left(\dfrac{2}{x-3}\right)\right] \cdot \dfrac{-2}{(x-3)^2}$

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

$= \dfrac{e^{5x+1}\ (5x+9)}{(x+2)^2}$

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

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

$= \dfrac{(x^2 + 2x + 2)\ e^x}{(x+2)^2}$

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

$= \dfrac{-3x+2}{2\sqrt{x-1}\ (3x+4)^2}$

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

$= \dfrac{\sqrt{x+2}}{2\sqrt{3x+1}} \cdot \dfrac{5}{(x+2)^2}$

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

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

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

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

$= \dfrac{-1}{2\sqrt{x - x^2}}$

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1. $f'(x) = \dfrac{-x^2 + 4x - 10}{(x-2)^2}$, $f'(1) = \dfrac{-15}{9}$;

$f'(3) = -7$; $f'(5) = \dfrac{-15}{9}$

2. $f'(x) = \dfrac{4}{3}\left(\dfrac{x}{3} + 1\right)^3$, $f'(-4) = \dfrac{-4}{81}$; $f'(-3) = 0$;

$f'(0) = \dfrac{4}{3}$; $f'(1) = \dfrac{256}{81}$

3. $f'(x) = \dfrac{e^x - e^{-x}}{2}$, $f'(-2) \approx 3{,}63$; $f'(0) = 0$;

$f'(3) = 10{,}02$