Calcula la derivada de las siguientes funciones.

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|---|---|---|
| $y=\left(2x^4-3x^2+7x\right)^5$ | $\rightarrow$ | $y'=5\left(2x^4-3x^2+7x\right)^4\left(8x^3-6x+7\right)$ |
| $y=\sqrt{x^3-5x^2+6x-9}$ | $\rightarrow$ | $y'=\dfrac{3x^2-10x+6}{2\sqrt{x^3-5x^2+6x-9}}$ |
| $y=\sqrt[3]{9x^2+x-8}$ | $\rightarrow$ | $y=\left(9x^2+x-8\right)^{1/3}$<br>$y'=\dfrac{1}{3}\left(9x^2+x-8\right)^{\frac{1}{3}-1}(18x+1)=\dfrac{1}{3}\left(9x^2+x-8\right)^{\frac{-2}{3}}(18x+1)=$<br>$=\dfrac{(18x+1)}{3\left(9x^2+x-8\right)^{\frac{2}{3}}}=\dfrac{(18x+1)}{3\sqrt[3]{\left(9x^2+x-8\right)^2}}$ |
| $y=\sqrt[5]{\left(3x^4-6x^2\right)^3}$ | $\rightarrow$ | $y=\left(3x^4-6x^2\right)^{\frac{3}{5}}$<br>$y'=\dfrac{3}{5}\left(3x^4-6x^2\right)^{\frac{3}{5}-1}\left(12x^3-12x\right)=\dfrac{3}{5}\left(3x^4-6x^2\right)^{\frac{-2}{5}}\left(12x^3-12x\right)=$<br>$=\dfrac{3\left(12x^3-12x\right)}{5\left(3x^4-6x^2\right)^{\frac{2}{5}}}=\dfrac{3\left(12x^3-12x\right)}{5\sqrt[5]{\left(3x^4-6x^2\right)^2}}$ |
| $y=\dfrac{x^2-5x}{3x-2}$ | $\rightarrow$ | $y'=\dfrac{(2x-5)(3x-2)-\left(x^2-5x\right)3}{(3x-2)^2}=\dfrac{6x^2-4x-15x+10-3x^2+15x}{(3x-2)^2}=$<br>$=\dfrac{3x^2-4x+10}{(3x-2)^2}$ |
| $y=\dfrac{3x^2-6x}{x^4-2x^2+6}$ | $\rightarrow$ | $y'=\dfrac{(6x-6)\left(x^4-2x^2+6\right)-\left(3x^2-6x\right)\left(4x^3-4x\right)}{\left(x^4-2x^2+6\right)^2}=$<br>$=\dfrac{6x^5-12x^3+36x-6x^4+12x^2-36-\left(12x^5-12x^3-24x^4+24x^2\right)}{\left(x^4-2x^2+6\right)^2}=$<br>$=\dfrac{-6x^5+18x^4-12x^2+36x-36}{\left(x^4-2x^2+6\right)^2}$ |
| $y=\sqrt{\dfrac{x^2-5x}{3x+7}}$ | $\rightarrow$ | $y'=\dfrac{1}{2\sqrt{\dfrac{x^2-5x}{3x+7}}}\dfrac{(2x-5)(3x+7)-\left(x^2-5x\right)3}{(3x+7)^2}=$<br>$=\dfrac{1}{2\sqrt{\dfrac{x^2-5x}{3x+7}}}\dfrac{6x^2+14x-15x-35-3x^2+15x}{(3x+7)^2}=\dfrac{1}{2\sqrt{\dfrac{x^2-5x}{3x+7}}}\dfrac{3x^2+14x-35}{(3x+7)^2}=$<br>$=\dfrac{3x^2+14x-35}{2(3x+7)^2\sqrt{\dfrac{x^2-5x}{3x+7}}}$ |
| $y=sen\left(x^2+5x\right)$ | $\rightarrow$ | $y'=(2x+5)\cos\left(x^2+5x\right)$ |
| $y=\cos\left(x^3-3^x\right)$ | $\rightarrow$ | $y'=-\left(3x^2-3^x\,Ln3\right)sen\left(x^3-3^x\right)=\left(-3x^2+3^x\,Ln3\right)sen\left(x^3-3^x\right)$ |
| $y=tg\sqrt{x}$ | $\rightarrow$ | $y'=\dfrac{\frac{1}{2\sqrt{x}}}{\cos^2\sqrt{x}}=\dfrac{1}{2\sqrt{x}\cos^2\sqrt{x}}$ |
| $y=sen^2x+tg^3x$ | $\rightarrow$ | $y'=2\,sen\,x\cos x+3\,tg^2x\,\dfrac{1}{\cos^2x}$ |

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|---|---|---|
| $y = sen\left(x^3 - 2x^2\right).\cos(5-x)$ | $\rightarrow$ | $y' = \left(3x^2 - 4x\right)\cos\left(x^3 - 2x^2\right).\cos(5-x) + sen\left(x^3 - 2x^2\right).\left(-(-1)\ sen(5-x)\right) =$ <br> $= \left(3x^2 - 4x\right)\cos\left(x^3 - 2x^2\right).\cos(5-x) + sen\left(x^3 - 2x^2\right).\ sen(5-x)$ |
| $y = \dfrac{x^2 + \cos x}{x - sen\, x}$ | $\rightarrow$ | $y' = \dfrac{(2x - sen\, x)(x - sen\, x) - \left(x^2 + \cos x\right)(1 - \cos x)}{(x - sen\, x)^2}$ |
| $y = e^{x^2 + 5x - 7}$ | $\rightarrow$ | $y' = (2x+5)\, e^{x^2+5x-7}$ |
| $y = 4^{x + \cos x}$ | $\rightarrow$ | $y' = 4^{x+\cos x}\ (Ln\ 4)(1 - sen\, x) = (1 - sen\, x)\, 4^{x+\cos x}\ Ln\ 4$ |
| $y = \left(x^3 - 5x^2\right)7^{x^2+5}$ | $\rightarrow$ | $y' = \left(3x^2 - 10x\right)7^{x^2+5} + \left(x^3 - 5x^2\right)2x\ 7^{x^2+5}\ Ln7 =$ <br> $= \left(3x^2 - 10x\right)7^{x^2+5} + \left(2x^4 - 10x^3\right)\ 7^{x^2+5}\ Ln7$ |
| $y = Ln\left(4x^3 - 6x\right)$ | $\rightarrow$ | $y' = \dfrac{12x^2 - 6}{4x^3 - 6x}$ |
| $y = \log\left(2x - x^2\right)$ | $\rightarrow$ | $y' = \dfrac{2 - 2x}{\left(2x - x^2\right) Ln 10}$ |
| $y = \log_5\left(x^3\ 3^x\right)$ | $\rightarrow$ | $y' = \dfrac{3x^2\ 3^x + x^3\ 3^x\ Ln 3}{x^3\ 3^x\ Ln 5} = \dfrac{3x^2 + x^3\ Ln 3}{x^3\ \ Ln 5} = \dfrac{3 + x\, Ln 3}{x\, Ln 5}$ <br> *También puede hacerse aplicando, previamente, las propiedades de los logaritmos,* $y = \log_5\left(x^3\ 3^x\right) = \log_5 x^3 + \log_5 3^x = 3\log_5 x + x\log_5 3$ <br> *Por lo tanto,* $y' = 3\ \dfrac{1}{x\, Ln 5} + \log_5 3 = \dfrac{3}{x\, Ln 5} + \dfrac{Ln 3}{Ln 5} = \dfrac{3 + x\, Ln 3}{x\, Ln 5}$ |
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