Derivadas

$$\overset{\cancel{}}{y} = \frac{1}{3}\underbrace{\left(2x^5 + 6x^{-3}\right)}_{u}^{5} \quad 5 = n$$

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① $y = u^n \Rightarrow y' = n \cdot (u^{n-1}) \cdot u' \quad n \in \mathbb{Z}^*$

$$y' = \left[\frac{1}{3}\left(2x^5+6x^{-3}\right)^5\right]'$$

$$y' = \frac{1}{3}\left[\left(2x^5+6x^{-3}\right)^5\right]'$$

$$y' = \frac{1}{3} \cdot 5 \cdot \left(2x^5+6x^{-3}\right)^4 \cdot \left(2x^5+6x^{-3}\right)'$$

$\cdot, -3$

$$y' = \frac{5}{3}\left(2x^5+6x^{-3}\right)^4 \cdot \left(10x^4-18x^{-4}\right)$$

$$y = (7t^2+6t)^7 \cdot (3t-1)^4$$

$$y = u \cdot v \Rightarrow y' = u' \cdot v + u \cdot v'$$

$$y' = \left[(7t^2+6t)^7 \cdot (3t-1)^4\right]'$$

$$y' = \left[(7t^2+6t)^7\right]' \cdot (3t-1)^4 + (7t^2+6t)^7 \cdot \left[(3t-1)^4\right]'$$

$$y' = 7(7t^2+6t)^6 \cdot (7t^2+6t)' \cdot (3t-1)^4$$
$$+ (7t^2+6t)^7 \cdot 4 \cdot (3t-1)^3 \cdot (3t-1)'$$

$$y' = 7(7t^2+6t)^6 \cdot (14t+6) \cdot (3t-1)^4 + 12(7t^2+6t)^7(3t-1)^3$$

$$(6t^1)' = 6(t^1)' = 6 \cdot 1 \cdot t^{1-1}$$
$$= 6 \cdot t^0 = 6 \cdot 1 = 6$$

$$(7t^2+6t)' = 2 \cdot 7 \cdot t^{2-1} + 6 \cdot 1 \, t^{1-1}$$
$$= 14t + 6.$$

$$y = \left(\frac{7t+1}{2t^2+3}\right)^{3}$$

$$y' = 3\cdot\left(\frac{7t+1}{2t^2+3}\right)^2\cdot\left(\frac{7t+1}{2t^2+3}\right)'$$

$$y = \frac{u}{v} \Rightarrow y' = \frac{u'\cdot v - u\cdot v'}{v^2}$$

$$y' = 3\left(\frac{7t+1}{2t^2+3}\right)^2\cdot\left[\frac{(7t+1)'\cdot(2t^2+3) - (7t+1)\cdot(2t^2+3)'}{(2t^2+3)^2}\right]$$

$$y' = 3\left(\frac{7t+1}{2t^2+3}\right)^2\left[\frac{7\cdot(2t^2+3) - (7t+1)\cdot(4t)}{(2t^2+3)^2}\right]$$

$$y' = 3\left(\frac{7t+1}{2t^2+3}\right)^2\cdot\left[\frac{14t^2+21-28t^2-4t}{(2t^2+3)^2}\right]$$

$$y' = 3\,\frac{(7t+1)^2}{(2t^2+3)^2}\cdot\frac{(-14t^2-4t+21)}{(2t^2+3)^2}$$

$$y' = \frac{3\cdot(7t+1)^2(-14t^2-4t+21)}{(2t^2+3)^2}$$

$$y = 2^{3x^2+6x}$$

$$y = a^u \Rightarrow y' = a^u \cdot \ln(a) \cdot u' \quad (a>0, a \neq 1)$$

$$y' = \left(2^{3x^2+6x}\right)' = 2^{3x^2+6x} \cdot \ln(2) \cdot (3x^2+6x)'$$

$$y' = \ln(2) \cdot 2^{3x^2+6x} \cdot (6x+6)$$

$$y' = \ln(2) \cdot (6x+6) \cdot 2^{3x^2+6x}$$

$$y = e^u \Rightarrow y' = e^u \cdot \ln(e) \cdot u'$$

$$\Rightarrow y' = e^u \cdot u'$$

$$e^x \Rightarrow (e^x)' = e^x \cdot x' = e^x$$

$$y = \log_3\left(\sqrt{s+1}\right)$$

$$y = \log_a(u) \Rightarrow y' = \frac{u'}{u} \cdot \log_a(e)$$

$$y' = \frac{\left(\sqrt{s+1}\right)'}{\sqrt{s+1}} \cdot \log_3(e)$$

$$y' = \frac{\left[(s+1)^{\frac{1}{2}}\right]'}{\sqrt{s+1}} \cdot \log_3(e)$$

$$y' = \frac{\frac{1}{2}(s+1)^{\left(\frac{1}{2}-1\right)} \cdot (s+1)'}{\sqrt{s+1}} \cdot \log_3(e)$$

$$y' = \frac{1}{2}\,\frac{(s+1)^{-\frac{1}{2}} \cdot}{\sqrt{s+1}} \cdot \log_3(e) \cdot$$

$$y' = \frac{1}{2} \cdot \frac{1}{\sqrt{s+1}} \cdot \frac{1}{\sqrt{s+1}} \cdot \log_3(e)$$

$$y' = \frac{1}{2}\,\frac{1}{(s+1)} \cdot \log_3(e) = \frac{\log_3(e)}{2(s+1)}$$

$$y = \frac{1}{2}\underbrace{(a+bs)}_{u}^{\overbrace{\ln(a+bs)}^{v}}$$

$$y = u^{v} \Rightarrow y' = v \cdot u^{v-1} \cdot u' + u^{v}\ln(u) \cdot v'$$

$$y' = \frac{1}{2} \cdot \ln(a+bs) \cdot (a+bs)^{\ln(a+bs)-1} \cdot \boxed{(a+bs)'} \cdot$$

$$+ \frac{1}{2}(a+bs)^{\ln(a+bs)} \cdot \ln(a+bs) \cdot (\ln(a+bs))'$$

$$y' = \frac{\ln(a+bs)}{2}\left[(a+bs)^{\ln(a+bs)-1} \cdot b + (a+bs)^{\ln(a+bs)} \cdot \frac{(a+bs)'}{(a+bs)} \cdot \ln(e) \cdot\right]$$

$$y' = \frac{\ln(a+bs)}{2}\left[b(a+bs)^{\ln(a+bs)-1} + (a+bs)^{\ln(a+bs)} \cdot (a+bs)^{-1} \cdot b\right]$$

$$y' = \frac{\ln(a+bs)}{2} \cdot \left[\underbrace{b(a+bs)^{\ln(a+bs)-1}} + \underbrace{b(a+bs)^{\ln(a+bs)-1}}\right]$$

$$y' = \frac{\ln(a+bs)}{\cancel{2}} \cdot \cancel{2} \cdot b(a+bs)^{\ln(a+bs)-1}$$

$$y' = b \cdot \ln(a+bs) \cdot (a+bs)^{\ln(a+bs)-1}$$

$$y = \operatorname{sen}^3(3x^2+6x) = \underbrace{\left(\operatorname{sen}(3x^2+6x)\right)^3}$$

$$y = \operatorname{sen}(u) \Rightarrow y' = \cos(u) \cdot u'$$

$$y' = 3\operatorname{sen}^2(3x^2+6x) \cdot \left(\operatorname{sen}(3x^2+6x)\right)'$$

$$y' = 3\operatorname{sen}^2(3x^2+6x) \cdot \cos(3x^2+6x) \cdot (3x^2+6x)'$$

$$y' = 3 \cdot \operatorname{sen}^2(3x^2+6x) \cdot \cos(3x^2+6x) \cdot (6x+6)$$

$$y' = (18x+18) \cdot sen^2(3x^2+6x) \cdot \cos(3x^2+6x)$$

$$y' = 18(x+1) \cdot sen^2(3x^2+6x) \cdot \cos(3x^2+6x)$$

$$y = \cos\left(\frac{\pi}{2} - u\right)$$ u é variável

$$y = \cos(u) \Rightarrow y' = -sen(u) \cdot u'.$$

$$y' = \left[\cos\left(\frac{\pi}{2} - u\right)\right]' = -sen\left(\frac{\pi}{2} - u\right) \cdot \left(\frac{\pi}{2} - u\right)'$$

$$y' = -sen\left(\frac{\pi}{2} - u\right) \cdot (-1)$$

$$y' = sen\left(\frac{\pi}{2} - u\right)$$ porque u é variável

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$$y = 3\,tg(2x+1)$$

$$y = tg(u) \Rightarrow y' = sec^2(u) \cdot u'$$

$$y' = \left[3\,tg(2x+1)\right]'$$

$$y' = 3\left[tg(2x+1)\right]' = 3\,sec^2(2x+1) \cdot (2x+1)'$$

$$y' = 3 \cdot \sec^2(2x+1) \cdot 2 = 6\sec^2(2x+1).$$

$$y = \frac{3\sec(x)}{x}$$

$$y = \sec(x) \Rightarrow y' = \sec(u) \cdot \tan(u) \cdot u'$$

$$y' = \left[\frac{3\sec(x)}{x}\right]' = \frac{(3\sec(x))' \cdot x - 3\sec(x) \cdot (x)'}{x^2}$$

$$y' = \frac{3 \cdot \sec(x) \cdot \tan(x) \cdot \overset{1}{(x)'} \cdot x - 3\sec(x)}{x^2}$$

$$y' = \frac{3\sec(x) \cdot \tan(x) \cdot x - 3\sec(x)}{x^2}$$

$$y' = \frac{3\sec(x) \cdot (\tan(x) \cdot x - 1)}{x^2}$$

$$y = \cot g^3(2s-1)$$

$$y = \cot g(u) \Rightarrow y' = -\csc^2(u) \cdot u'$$

$$y' = 3 \cdot \cot g^2(2s-1) \cdot (\cot g(2s-1))'$$

$$y' = 3\left[\cot g^2(2s-1)\right]\cdot\left(-\csc^2(2s-1)\cdot(2s-1)'\right)$$

$$y' = -3\left(\cot g^2(2s-1)\right)\left(\csc^2(2s-1)\right)2$$

$$y' = -6\left(\cot g^2(2s-1)\right)\left(\csc^2(2s-1)\right)$$

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$$y = -\csc^2(\theta^3)$$

$$y = \csc(u) = y' = -\csc(u)\cdot\cot(u)\cdot u'$$

$$y' = \left(-\csc^2(\theta^3)\right)' = -2\csc(\theta^3)\cdot\left(\csc(\theta^3)\right)'$$

$$y' = -2\csc(\theta^3)\cdot\left(-\csc(\theta^3)\cdot\cot g(\theta^3)\right)\cdot(\theta^3)'$$

$$y' = 2\csc^2(\theta^3)\cdot\cot g(\theta^3)\cdot(3\theta^2)$$

$$y' = 6\theta^2\csc^2(\theta^3)\cdot\cot g(\theta^3)$$

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$$y = \operatorname{arcsec}(\sqrt{x})$$

$$y' = \operatorname{arcsec}(u), \quad |u| \geq 1 \Rightarrow y' = \frac{u'}{|u|\sqrt{u^2-1}} \quad |u| > 1$$

$$y' = \frac{(\sqrt{x})'}{|\sqrt{x}| \cdot \sqrt{(\sqrt{x})^2 - 1}} \qquad |\sqrt{x}| > 1$$

$$\sqrt{x} = (x)^{\frac{1}{2}}$$

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

$$= \frac{1}{2} x^{-\frac{1}{2}}$$

$$= \frac{1}{2} \cdot \frac{1}{\sqrt{x}}$$

$$= \frac{1}{2\sqrt{x}}$$

$$y' = \frac{\frac{1}{2\sqrt{x}}}{|\sqrt{x}| \cdot \sqrt{|x| - 1}}$$

$$y' = \frac{1}{2 \cdot \sqrt{x} \cdot |\sqrt{x}| \cdot \sqrt{|x| - 1}}$$

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