

$$a) [\sin(\cos(4x^3+3))]^2 = \cos(\cos(4x^3+3)) \cdot (-\sin(4x^3+3)) \cdot (4 \cdot 3x^2 + 0) = \cos(\cos(4x^3+3)) \cdot (-\sin(4x^3+3)) \cdot 12x^2$$

derivative of sine the most outer the next function is the after simplifications, there is
 of cosine of four function is sine, cosine and its derivative cosine of cosine of four x cubic
 x cube plus three so its derivative is is minus sine of the same plus three, times minus sine
 equal to cosine argument. Then we multiply of four x cubic plus three
 everything by the inner times twelve x square
 function derivative: four
 times three x square plus
 zero.

Author Kinga Basa

I year student EPM

$$b) [\log_7(\operatorname{tg}(50x^{49} + 7x^{15}))]' = \frac{1}{\operatorname{tg}(50x^{49} + 7x^{15}) \cdot \ln 7} \cdot \left(\frac{1}{\cos^2(50x^{49} + 7x^{15})} \cdot (50 \cdot 49x^{48} + 7 \cdot 15x^{14}) \right) = \frac{2450x^{48} + 105x^{14}}{\operatorname{tg}(50x^{49} + 7x^{15}) \cdot \ln 7 \cdot \cos^2(50x^{49} + 7x^{15})}$$

derivative of logarithm with base seven of tangent of fifty x to the power of forty nine plus seven x to the power of fifteen
 the most outer function is the logarithm with base seven, so its derivative is equal to one over the tangent of fifty x to the power of forty nine times the natural logarithm of seven
 not, there is derivative of tangent, which is equal one over cosine square of its argument
 at last, there is derivative of the inside, so there is fifty times forty nine x to the power of forty eight plus seven times fifteen x to the power of fourteen
 we can write these derivatives as two thousand four hundred fifty x to the power of forty eight plus one hundred five x to the power of fourteen divided by tangent of fifty x to the power of forty nine plus seven x to the power of fourteen times natural logarithm of seven times cosine square of fifty x to the power of forty nine plus seven x to the power of fifteen

Author Kinga Basa
 1 year student EPM

the power of fifteen times natural logarithm of seven times cosine square of fifty x to the power of forty nine plus seven x to the power of fourteen divided by tangent of fifty x to the power of forty nine plus seven x to the power of fourteen

$$c) [\arctg(1 + \sin x)]' =$$

derivative of arc
tangent of one
plus sine of x

$$\frac{1}{1 + (1 + \sin x)^2}$$

the most outer function
is arc tangent and its
derivative is one over
one plus one plus sine
of x to the power of two

$$\cdot \cos x$$

next, there is
derivative of the
inside which is
equal to the
cosine of x

$$= \frac{\cos x}{2 + 2\sin x + \sin^2 x}$$

finally we have cosine of
x over two plus two sines
of x plus sine square of x

Author: Kimga Base
1 year student EPM

$$d) (20^{\sin 3x})'$$

derivative of
twenty to the
power of sine three
x

$$= 20^{\sin 3x} \cdot \ln 20 \cdot (\sin 3x)'$$

derivative of this function
is equal twenty to the same
power times natural logarithm
of twenty and all times
derivative of power

$$= 20^{\sin 3x} \cdot \ln 20 \cdot \cos 3x \cdot 3$$

finally we have original function
times natural logarithm of twenty
times cosine of three x times three

Author: Kinga Base

1 year student of EPM