

# "WHAT TO SAY IN FRONT OF THE BLACKBOARD" - A BRIEF TUTORIAL

EXERCISE: Calculate the derivative of:

$$a) [\sin(\cos x + \tan x)]' = \cos(\cos x + \tan x) \cdot (-\sin x + \frac{1}{\cos^2 x})$$

THE DERIVATIVE OF SINE OF SUM OF COSINE X AND TANGENT X

IT WAS A COMPOSITE FUNCTION SO FIRST I'LL WRITE DERIVATIVE OF THE OUTER FUNCTION WHICH IS THE COSINE FUNCTION

NEXT I'LL WRITE DERIVATIVE OF THE INNER FUNCTION OF THE SINE, IT IS MINUS SINE X PLUS ONE OVER COSINE SQUARE OF X

$$b) [x \cdot \ln(\ln(x))]' = \ln(\ln(x)) + x \cdot \frac{1}{\ln(x)} \cdot \frac{1}{x} = \ln(\ln(x)) + \frac{1}{\ln(x)}$$

THE DERIVATIVE OF X TIMES THE NATURAL LOGARITHM OF NATURAL LOGARITHM OF X

FIRST I'LL WRITE DERIVATIVE OF X WHICH IS ONE MULTIPLIED BY NATURAL LOGARITHM OF NATURAL LOGARITHM OF X

I REWRITE X

DERIVATIVE OF NATURAL LOGARITHM OF X IS ONE OVER NATURAL LOGARITHM OF X TIMES ONE OVER X

IN THE END I MULTIPLY X AND ONE OVER X, IT IS ONE

$$c) \left[ \frac{\sin x + 1}{\cos x + 1} \right]' = \frac{\cos x (\cos x + 1) - (\sin x + 1) \cdot (-\sin x)}{(\cos x + 1)^2} = \frac{\cos^2 x + \cos x + \sin^2 x + \sin x}{(\cos x + 1)^2} = \frac{1 + \cos x + \sin x}{(\cos x + 1)^2}$$

DERIVATIVE OF SUM OF SINE X AND ONE OVER SUM OF COSINE X AND ONE

I MULTIPLY DERIVATIVE OF SINE X PLUS ONE, WHICH IS COSINE X, BY COSINE X PLUS ONE. NEXT I SUBSTRACT THE PRODUCT OF SINE X PLUS ONE AND THE DERIVATIVE OF COSINE X PLUS ONE, WHICH IS MINUS SINE X. EVERYTHING IS DIVIDED BY SQUARE OF COSINE X PLUS ONE.

I MULTIPLY AND SIMPLIFY EVERYTHING

SINE SQUARE OF X PLUS COSINE SQUARE OF X IS EQUAL ONE

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