a) $(x^2 \sin x + x \sin^2 x + \sin^3 x)' = (2x \cdot \sin x + x^2 \cdot \cos x) + (1 \sin^2 x + x \cdot 2 \cdot \sin x \cdot \cos x) + 3 \cdot \sin^2 x \cdot \cos x$

the derivative of x square multiplied by sine of x plus x multiplied by sine square of x plus sine cubic of x

I have to use the product rule and I write the derivative of x^2 which is $2x$

here I write the derivative of sine of x which is cosine of x

next I also use the product rule and I write the derivative of x which is 1

here the most outer function is x^2 and the derivative of it is $2x$ and then the derivative of sine of x which is cosine of x

finally I write the derivative of the most outer function x^3 which is $3x^2$ and then the derivative of sine of x which is cosine of x

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

sine of x plus cosine of x divided by tangent of x

I have to use the quotient rule. In the bracket I write the derivative of sine of x and the cosine of x

I divided everything by tangent square of x

I write the derivative of tangent of x which is 1 over cosine square of x

c) $\left[\frac{1}{\operatorname{tg}^2 x + \operatorname{ctg}^2 x}\right]' = \frac{0 \cdot (\operatorname{tg}^2 x + \operatorname{ctg}^2 x) - 1 \cdot (2 \operatorname{tg} x \cdot \frac{1}{\cos^2 x} + 2 \operatorname{ctg} x \cdot (-\frac{1}{\sin^2 x}))}{(\operatorname{tg}^2 x + \operatorname{ctg}^2 x)^2} = \frac{-2 \operatorname{tg} x}{\cos^2 x} + \frac{2 \operatorname{ctg} x}{\sin^2 x}$ / $(\operatorname{tg}^2 x + \operatorname{ctg}^2 x)^2$

One over tangent square of x plus cotangent square of x

I use the quotient rule and I write the derivative of 1 which is 0

I take the denominator in the bracket and raise it to the power of two

In the second bracket I write the derivative of the most outer function x^2 which is $2x$ and the derivative of tangent of x which is 1 over cosine square of x

I write the derivative of the most outer function x^2 which is $2x$ and the derivative of cotangent of x which is minus 1 over sine square of x

d) $\left(7^{17x+12\ln x}\right)' = 7^{17x+12\ln x} \cdot \ln 7 \cdot (17x+12\ln x)' = 7^{17x+12\ln x} \cdot \ln 7 \cdot \left(17+\frac{12}{x}\right)$

seven to the power of seventeen x plus twelve multiplied by natural logarithm of x

I calculate the derivative of a^x and according to the differentiation rule it is a^x multiplied by natural logarithm of a

then I multiply it by the derivative of the most inner function which is seventeen plus twelve over x

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