

## Worksheet #3

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1) Derivate the following functions

a)  $(x^2 + 3x + 4)^{10}$

b)  $\frac{1}{\sqrt{x^4 + 2x^2}}$

c)  $2^{3^x}$

d)  $\frac{e^x + e^{-x}}{e^x - e^{-x}}$

e)  $\frac{xe^x}{2x+1}$

f)  $x^x$  (Hint: Remember  $a^b = e^{b \ln(a)}$ )

g)  $x^2 \ln(x) - x \ln^2(x)$

2) If  $f'(2) = 4$ ,  $g(3) = 2$ ,  $g'(3) = 5$ , calculate  $(f \circ g)'(3)$ 

3) Find the slope of the tangent line of the following functions at the given points

a)  $\frac{3x-4}{e^{2x}+1}$  at  $x=0$

b)  $(5x^2-4)^9 (x^2+3x-4)^8$  at  $x=1$

c)  $\ln(x^{\frac{3}{2}} \cdot \sqrt{x^2+1})$  at  $x=4$