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IN-CLASS ACTIVITY : EXPONENTIALS AND LOGARITHMS

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1. Find the equation of the line normal to the graph of  $f(x) = x5^x$  at the point  $x = -1$ .
2. Compute the derivative of the following functions :
  - i)  $f(x) = 2^{4x} + 4x^2$
  - ii)  $f(x) = 3^{\sin(3x)}$
  - iii)  $f(x) = x^\pi \pi^x$
  - iv)  $f(x) = \ln(4x^3 + x)$
  - v)  $f(x) = \ln(\sqrt{5x-7})$
  - vi)  $f(x) = x^2 \ln(9x)$
  - vii)  $f(x) = \log_7(6x^4 + 3)$
  - viii)  $f(x) = 2^x \log_3(x)$
  - ix)  $f(x) = x^{\sqrt{x}}$
  - x)  $f(x) = x^{\log_2(x)}$
3. Find the equation of the line tangent to the curve  $x^3 - x \ln(y) + y^3 - 2x - 5 = 0$  at the point  $x = 2$ . (*Hint : Use implicit differentiation.*)
4. Consider the function  $f(x) = x^{\frac{1}{x}}$  :
  - i) Determine the points where the tangent line is horizontal;
  - ii) Determine the intervals where the function is increasing.