(20 pts)   **1)** Compute the derivative of

     a) $f(x) = e^{\tan x}$ b) $g(x) = \ln(\sec x)$ c) $s(t) = \cos(\sqrt{t^2 + 1})$.

(20 pts)   **2)**   Consider the function $f(x) = x^4 - 18x^2 + 2$.
     a) Find the intervals of increase and decrease.
     b) Find the local maximum and minimum values.
     c) Find the intervals of concavity and any points of inflection.
     YOU MUST SHOW YOUR WORK!

(20 pts)   **3)** Find the equation of the line tangent to the graph of $2xy = \pi \sin(y)$ at the point $(0, 2\pi)$.
     Write your answer using slope-intercept form.

(20 pts)   **4)** Compute the second derivative of $f(x) = e^{2x} \cosh(3x)$.   **(Simplify your answer as much as possible!)**

(10 pts)   **5) a)** Find the absolute minimum and maximum values of the function $f(x) = 4x^3 + 3x^2 - 6x$ on
     the interval $[-2, 1]$. **YOU MUST SHOW YOUR WORK!**

(10 pts)   **b)** Determine the derivative of the function $g(t) = (t^2 + 2t)^{\sin t}$.