COMP406 Assignment #2

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1. [6 marks] Find the tangent line to $f(x) = 4\sqrt{(2x)} - 6e^{2-x}$ at $x = 2$.

2. Differential the following equations:

   a. [3 marks] $f(x) = (1 + e^{-3x}) / (x + tan(15x))$.

   b. [3 marks] $f(x) = \ln(1 - 5x^2 + x^3)$.

   c. [4 marks] $\lim_{x \to 1} (x^2 + 8x - 9) / (x^3 - 2x^2 - 6x + 7)$

3. Answer the following questions for the function $f(x) = 9x - 5\sin(2x)$ for the range [-5, 0].

   a. [4 marks] Identify the critical points of the function.

   b. [4 marks] Determine the intervals on which the function increases and decreases.

   c. [4 marks] Identify the critical points as local maximums, local minimums, or neither.

   d. [4 marks] What are the global maximum and global minimum of the function in the range [-5, 0]?

   e. [4 marks] Sketch the graph? **Bonus** [2 marks] You might also need to consider which region of the graph is concave, and which region of the graph is convex.