Show all work, clearly and legibly, to receive full credit. Correct spelling, organization of your solution, and proper use of mathematical notation all count. You may use a stand-alone graphing calculator, but not any internet-based calculators. No notes, books, or other additional resources are permitted. Good luck!

1.) (4 pts.) The graph of \( f' \) is shown below. Note: This is not the graph of \( f \). Use the graph of \( f' \) to answer the question: Where does \( f \) have a local minimum? Explain how you know this from the graph of \( f' \).

   \[
   A \text{ at } x = -3. \text{ This is due to the First Derivative Test:}
   \]
   \[
   \text{For } x < -3, \quad f' < 0, \quad \text{and for } x > -3, \quad f' > 0, \quad \text{so at } x = -3, \quad f \text{ has a local minimum}
   \]

2.) (4 pts.) Let \( f(x) = \sin x \).

   a.) For \( x = 1.38 \) and \( x = 1.42 \), compute \( f(x) \).
   \[
   \sin 1.38 = 0.98185 \\
   \sin 1.42 = 0.98865
   \]

   b.) Use your answers from part (a) to show that \( f'(1.4) \) is approximately 0.17. (Notice you are given the estimate, and are being asked to show the steps that justify the estimate.)
   \[
   \frac{0.98865 - 0.98185}{1.42 - 1.38} \approx 0.17
   \]

3.) (2 pts.) Simplify by writing an equivalent expression having no parentheses: \( -(3xy)^2 \).

   \[
   -9x^2y^2
   \]