Matlab

1. Graph f' and f'' to estimate the intervals of increase, decrease, extreme values, intervals of concavity, and inflection points of

    (a) $f(x) = 4x^4 - 32x^3 + 89x^2 - 95x + 29$

    (b) $f(x) = x^6 - 10x^5 - 400x^4 + 2500x^3$

    and verify the critical points using Matlab.

2. Graph the function. Use l'Hospitals's Rule to explain the behavior as $x \to 0$. Estimate the minimum values and intervals of concavity. Then use calculus to find the exact values of
$$f(x) = x^2 \ln x$$

3. Consider a member of the family of functions
$$f(x) = \sin(x + \sin cx)$$

    that occur in FM synthesis. Here we investigate the function with $c = 3$. Start by graphing f in the viewing rectangle $[0, \pi]$ by $[-1.2, 1.2]$. How many local max do you see? The graph has more that are visible to the naked eye. To discover the hidden max and min points you will need to examine the graph of f' very carefully. In fact, it helps to look at the graph of f'' at the same time. Find all the max and min values and inflection points. Then graph f in the viewing rectangle $[-2\pi, 2\pi]$ by $[-1.2, 1.2]$ and comment on symmetry. Hint: Is $\sin(x)$ an even or odd function?