

**MA104 - Differential Calculus**  
**Homework Assignment 2 - 35 points**  
**Due by 1600 on February 22, 2008**

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1. Let  $g(x) = 2x^4 - 8x^2 + 19$ .
  - (a) Find and classify all critical points for the function. Whether or not you use Mathematica, you must fully *justify your answer*.
  - (b) Find the inflection points for the function, and justify your answer.
2. Find the absolute maximum and minimum for  $f(x) = \frac{x^2}{2} + 25 \ln x$  on the interval  $[1, 8]$ . Whether or not you use Mathematica, you must fully *justify your answer*.
3. Determine a complete solution for problem 14 on page 328. Ensure that your set up for each problem contains the following:
  - (a) A labeled diagram
  - (b) Defined variables
  - (c) A constraint equation
  - (d) A function of *one variable* that needs to be optimized

Feel free to use Mathematica to do the leg-work, but explain your work! That is, don't just give a final answer, but explain what you did and what Mathematica gave you at each step of the optimization process.
4. Following the same instructions as in the problem above, determine a complete solution for Problem 35 on page 329, but taking  $V = 100$ .
5. Complete problem 11 on page 213.
6. Complete number 15 on page 245. Attach your work (make it neat!). Your solution must include the following steps:
  - (a) Draw and label a picture of the problem.
  - (b) Define your variables. Write down what you are solving for.
  - (c) Determine an equation that relates all your variables.
  - (d) Take a derivative of the equation (don't forget the chain rule!).
  - (e) Substitute in your known quantities.
  - (f) Solve for the unknown.