

Math 141 Honors Problems #7

Due date: Tuesday, 10/6/09

HP14 [3 points]

Problem #1 Consider the function

$$b(x) = x^2 + \frac{\ln|x-2|}{1000}.$$

(#1a) Without using a calculator, sketch the graph of $b(x)$ for $-10 \leq x \leq 10$.

(#1b) Enter $b(x)$ into your calculator and have it draw the graph. The result will probably not look like the graph you drew in part 1 (at least if you are using a TI-83+ or something similar). Who's right, you or the calculator?

(#1c) Can you resolve this problem by changing the viewing window?

HP15 [4 points]

Let XYZ be an isosceles triangle with base $b = 2c$ and height h . (For example, let $X = (-c, 0)$, $Y = (c, 0)$, and $Z = (0, a)$. In terms of b and h , determine the point P such that

$$d(P, X) + d(P, Y) + d(P, Z)$$

is as small as possible, where $d(P, X)$ means the distance between points P and X . (Hint: Be careful — there may be multiple cases depending on how big b and h are with respect to each other.)