Calculus 1A: Homework Assignments. Notes and Hints.

Revised 1/19/09

Spring 2009, TT 3:30pm - 5:00pm, Room 105 Stanley Hall

Instructor: Professor Zvezdelina Stankova

HW11. Read §4.7 (finish "Application to Business and Economics"), §4.8, and §4.9. Solve and Write Problems:

(1) §4.7: #52,54,56,58,62.

(2) §4.8: #2,4,6,8,12,16,20,34,36,38. #36: find $f'(x)$ and set it to equal 0 in order to find the critical points of $f(x)$. Use Newton's method to estimate the root r of $f'(x)$. Check what is going on with $f''(x)$ to show that $f(r)$ is indeed a local (and global) maximum (as opposed to minimum). Then plug in your estimate for r in $f(x)$ to find this global maximum.

(3) §4.9: #4,6,10,12,16,18,20*,22,26,32,34,40,44,46,48,50,62,66,74,76.

  (a) #6-12: rewrite the powers of x in the usual form x^n to make it easy for integration: this applies both to "roots" and to fractions. In #12 and #20: do **not** use any "quotient rule" for integration - there is **no** such rule! Instead, split the fraction into a sum of several fractions and integrate each such fraction separately; in the case of #20, the splitting of the fraction is easy but non-trivial!

  (b) #26, 40, 44: integrate once to get $f'(x)$, and then integrate another time to get $f(x)$: do **not** forget to add a constant C in the first integration, and then to add another constant D in the second integration. #46: at the end of the day, when the dust settles down and you have found out what $f(x)$ is, use the two given initial conditions to find the exact values of your constants C, D and E.

  (c) #66: compare with Example 7. You already know the displacement function $h(t)$ of the ball thrown with initial velocity 48 ft/s. Repeat the same steps to obtain the displacement function $g(t)$ of the ball thrown with initial velocity 24 ft/s. Note that $g(1) = 432$ m because, at time $t = 1$ sec, the second ball is at the initial height of $432\,m$. In essence, the question you are being asked - do the two balls pass each other - means: is it true that $h(t) = g(t)$ at some point **before** any of the balls hits the ground? So, solve this equation for t and see if this gives a reasonable practical answer. A good way to visualize the situation is to plot **both** graphs of $h(t)$ and $g(t)$ in the same coordinate plane and see if they intersect in a place above the x-axis (this corresponds to the two balls not having hit the ground yet, but being at the same time at the same height.)