Last update: Sat Jul 23 11:41:11 MDT 2005 /m170.su04/handouts170/t3_170_714/review_suggestions_3_tex

1 This list is not in final form. Like, stuff may yet be added to it.

2 Test #3 is

Thursday
7/14/05.

The test will cover the material of Assignments #18 – #28 roughly. But Rev2 is still live business.

3 There will be no with-calculator part of this exam.

4 Stuff to be able to do:

(a) Set up and solve related-rates problems. A rough grading rubric:

(i) relevant variables clearly indicated

(ii) no wastage of variable names on constants of the problem (3.10: 24 has the kite always $\mathbf{100}\ \boldsymbol{ft}$ above ground)

(iii) relevant non-microscopic diagram labeled clearly with the relevant variables

(iv) explicit properly-signed assignment of rate data to variables ("$\dfrac{\boldsymbol{dH}}{\boldsymbol{dt}} = \boldsymbol{-7\ furlong/fortnight}$")

(v) explicit relevant equation relating the variables (the $\mathbf{200}\ \boldsymbol{ft}$ datum of 3.10: 24 must not enter at this stage)

(vi) no leaking of particular-situation data into the general situation

(vii) explicit relevant equation relating the *rates of change* of the variables

(viii) explicit substitution of general and particular data into the rate-of-change equation

(ix) correct algebraic solution

(x) correct in-context prose final answer

(b) Make Stickman-$\boldsymbol{f}$ graphs (your instructor is totally infatuated with this activity).

(c) Use the $\boldsymbol{f''}$ sign information to "upholster" Stickman.

(d) Use l'Hôpital's Rule to evaluate limits.

(i) don't get l'Hôpital's Rule crossed up with the Quotient Rule.

(ii) don't apply l'Hôpital's Rule where it doesn't work

(iii) use **the Old Log Trick** to transform some limits to more amenable forms

(e) Find derivatives of the *Hyperbolic Functions* **sinh**, **cosh**, and **tanh**.

(f)

5 Stuff to know:

(a) How the signs of $\boldsymbol{f'}$ and $\boldsymbol{f''}$ affect the shape of the graph of $\boldsymbol{f}$.

(b) What is an *Extreme Value* for $\boldsymbol{f}$?

(c) What is a *Local Extreme Value* for $\boldsymbol{f}$?

(d) What is a *Critical Number* for $\boldsymbol{f}$?

(e) The difference between the ideas of *Critical Point* and *Extreme Point* for $\boldsymbol{f}$.

(f) What's an *Inflection Point* for $\boldsymbol{f}$?

(g) Given an equation in $\boldsymbol{x}$ and $\boldsymbol{y}$, know the difference between a $\dfrac{\boldsymbol{dy}}{\boldsymbol{dx}}$ calculation and a $\dfrac{\boldsymbol{dy}}{\boldsymbol{dt}}$ (this came up in problem 4 on test #2 and is vital for related-rates problems).

(h) The formal statement of **Mean-Value Theorem**.

(i) The sphere of applicability of l'Hôpital's Rule.

(j) How to fill in this table rapidly, and how to have its entries come to mind when needed.

(k) **Hyperbolic Functions**

(i) Definitions of **sinh**, **cosh**, and **tanh** in terms of exponential functions.

(ii) The *Hyperbolic Mom* identity.

(iii) How to find derivatives of **sinh**, **cosh**, and **tanh**.

(iv) How to sketch rough graphs of **sinh**, **cosh**, and **tanh**.

(v) How to use implicit differentiation to find $\mathbf{arctanh'}$.

(l)

(m)

(n)

6 Some relevant end-of-chapter problems:

(A) Chapter 2 (page 177):

(a) 45, 49

(B) Chapter 3 (page 271):

(a) 43, 45, 47, 49, 51

(b) 81, 85, 87

(c) 91, 93, 95

(d) 3.10: 31, 33, 35, 37

(C) Chapter 4 (page 362):

(a) 1, 3, 5 (absolute and local extremes)

(b) 7, 9, 11, 13

(c) 14 shows that $\boldsymbol{\infty^0 = 0}$, possibly, doesn't it?

(d) 15, 17 (at the heart of how $\boldsymbol{f'}$ and $\boldsymbol{f''}$ algebra inform the graph of $\boldsymbol{f}$)

(e) odds 19-33 (lacking, however, in problems involving $\boldsymbol{\ln(x)}$)