**REPETITION TEST # 2**

**Math I., Anal I.**

**12/12/01**

1. Give short answers:

a.) The differentiable function  has a local maximum at  if …

b.) The function  is concave up on an interval I if …

c.) How can you answer if the function  has a local extrema or a point of inflection at

 if ?

 6 points

2. Answer if the following statements are true or false. Give reason for your answer.

a.) If the function *f*(*x*) is monotonic then *f* is invertible.

b.) If the function *f*(*x*) is differentiable at  then the function *f* ’(*x*) is also differentiable at .

c.) If the functions *f*(*x*) and *g*(*x*) are odd functions then the function  is an even function.

 6 points

3. Show that .

6 points

4. Given the function ,

a.) find the domain and the range of *f****;***

b. find the inverse of *f*;

c.) find the limits  and , if they exist. 12 points

5. Without using a calculator find the *exact value* of . 6 points

6. a.) Put down the definition of the derivative of the function  at .

b.) Based on the definition find the derivative of  at . 10 points

7. Find the derivative of the functions:

 a.) , b.) . 10 points

8. Find the equation of the line perpendicular to the line  and tangent to the graph of . 8 points

9. Find the values of *a* and *b* such that the function *f* be differentiable at :

. 6 points

10. a.) Put down L’Hopital’s Rule.

b.) Answer if the limit  can be found by using this rule. If so, find the limit, if not, say why. 8 points

11. What values of *a* and *b* make the function  have a local minimum at  and a point of inflection at ? 8 points

12. Find all extremal points of the function .

 6 points

13. What is the largest area of a rectangle inscribed into the ellipse ?

 12 points

14. Graph the function (find the domain, range, zero(s), extrema, point(s) of inflection

(if any), limit at the endpoit(s) of the domain then make the graph):

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 16 points

 Total: 100 + 20 points