MAC 2311 Exam 3 Review

1. Find by implicit differentiation 3.5 #14:
2. If and find 3.5 #21
3. Use implicit differentiation to find an equation of the tangent line to the curve at the given point 3.5 #26:
4. Show that the given family of curves are orthogonal trajectories of each other 3.5 #68:
5. Find the derivative of the following functions 3.5 #50, 52:

a) b)

1. Differentiate the following functions: 3.6

a) #8 b) #14

c) #48

1. Two cars start moving from the same point. One travels south at 60 mi/h and the other travels west at 25 mi/h. At what rate is the distance between the cars increasing two hours later? 3.9 #15
2. A kite 100 ft above the ground moves horizontally at a speed of 8 ft/s. At what rate is the angle between the string and the horizontal decreasing when 200 ft of string has been let out? 3.9 #28
3. Find the linear approximation of the function at and use it to approximate the numbers and . 3.10 #6
4. Find the differential *dy* and evaluate *dy* at the given values of *x* and *dx*. 3.10 16

0.02

11. Compute and for the given values 3.10 #20:

12. Evaluate the following expressions/limits: 3.11 #2, 6, 23:

a) b)

c) d)

13. Find the following derivatives 3.11 #34, 42:

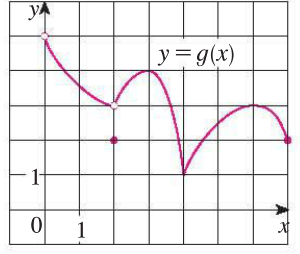
a) b)

14. Suppose is a continuous function defined on a closed interval . 4.1 #2

a) What theorem guarantees the existence of an absolute maximum and an absolute minimum value for ?

b) What steps would you take to find those maximum and minimum values?

15. State where the following graph has an absolute maximum or minimum, a local maximum or minimum, or neither a maximum nor minimum. 4.1 #6



16. Find the critical numbers of the following functions 4.1 #30, 40:

a) b)

17. Find the absolute maximum and absolute minimum values of on the given interval

4.1 #54:

18. Verify that the function satisfies the three hypotheses of Rolle’s Theorem on the given interval. Then find all numbers *c* that satisfy the conclusion of Rolle’s Theorem. 4.2 #2

19. Verify that the function satisfies the hypotheses of Mean Value Theorem on the given interval. Then find all numbers *c* that satisfy the conclusion of Mean Value Theorem. 4.2 #12

20. Show that the equation has exactly one real root 4.2 #18:

21. If and for , how small can possibly be? 4.2 #23