**MAT 110**

**Maxima/Minima for Several Variables**

**Practice the following exercise problems from the Text Book “Calculus” by Howard Anton 10th Edition. The soft copy of the book is available on TSR.**

1. **Chapter 13.8, Page 986, Exercise 9-20**

**Topic: Maxima Minima of a function of several variables.**

Critical Points:

A pt (,) in the domain of a function f(x,y) is called a critical pt of the function if & of if one or both partial derivatives do not exists at (,).

The second partial Test:

Let f be a function of two variables with continuous second order partial derivatives in some disk centered at critical pt (,), and let D =

1. If D>0 & >0, then f has a relative minimum at (,).
2. If D>0 & <0, then f has a relative maximum at (,).
3. If D<0 then f has a saddle pt at (,); [A saddle point is a point in the domain of a function that is a stationary pt but not a local extremum.]
4. If D = 0 then no conclusion.

Text Book Exercises: **Chapter 13.8, Page 986, Exercise 9-20**

14. f(x,y) =

Find critical pts: =>

no critical point.

18. f(x,y) =ysinx

Find critical pts: sinx = 0 =>x=

ycosx = 0

ycos(0)=0

y=0

critical pts: (0,0)

;

; , (0,0)= 1

has a saddle pt at (0,0)

19. f(x,y)=

Critical pts:

= 0 -------------(1)

= 0 --------------------(2)

Compare eqn 1 & 2

Both represents a straight line

Two intersecting pts are (-1,0) and (0,1)

(-1,0) satisfies eqn 1 and 2

(0,1) does not satisfy either 1 or 2.

Therefore (-1,0) is the only critical point.

At

Since

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