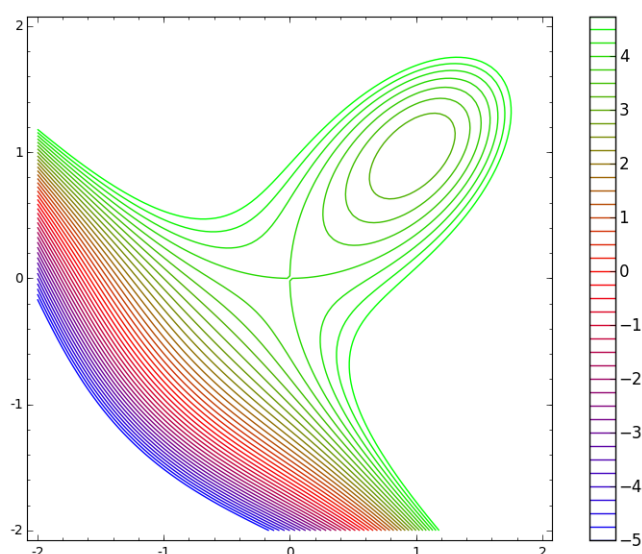# Math 242 - Homework 9   Due Thursday, October 30

Exercises from the Book

- Chapter 2.5# 1, 3, 5, 9, 10

- Chapter 2.7# 1, 2, 4

Additional Exercises

1. Use the level curves shown in the figure predict the locations of the critical points of f and whether f has a saddle point or a local maximum or minimum at those points. Then use the second derivative test to confirm your predictions.

2. Three alleles (alternative versions of a gene) A, B, and O determine the four blood types. If someone has two A genes or an A and an O gene, they have type A blood. If they have two B genes or a B and an O, they have type B blood. Someone with two O genes has type O blood, and finally, someone with an A and a B gene has type AB blood. The Hardy-Weinberg Law states that the proportion of individuals in a population who carry two different alleles is:

$$P = 2pq + 2pr + 2rq$$

where p, q, and r are the proportions of the genes A, B, and O in the population. Use the fact that $p + q + r = 1$ to show that P is at most $2/3$.