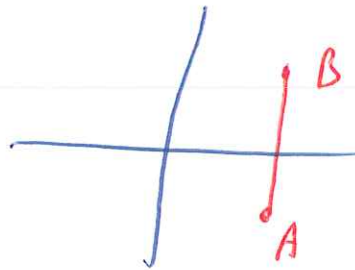
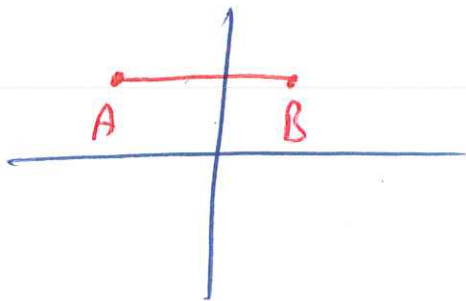


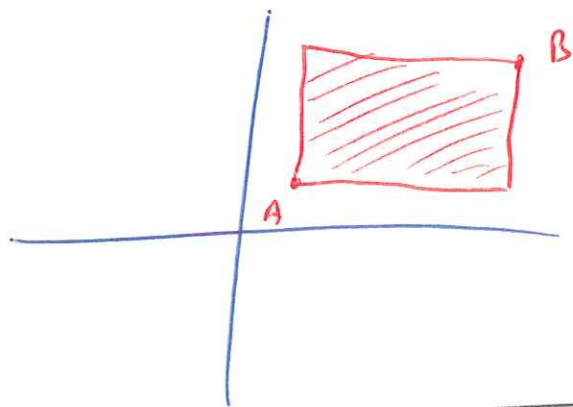
Problem: Find all points P between
2 given points A & B such that
$$d(A, P) + d(P, B) = d(A, B)$$

Idea: Find all points P which can be
reached while going from A to B
without making a detour

Case 1: vertical or horizontal separation



Case 2: "diagonal"



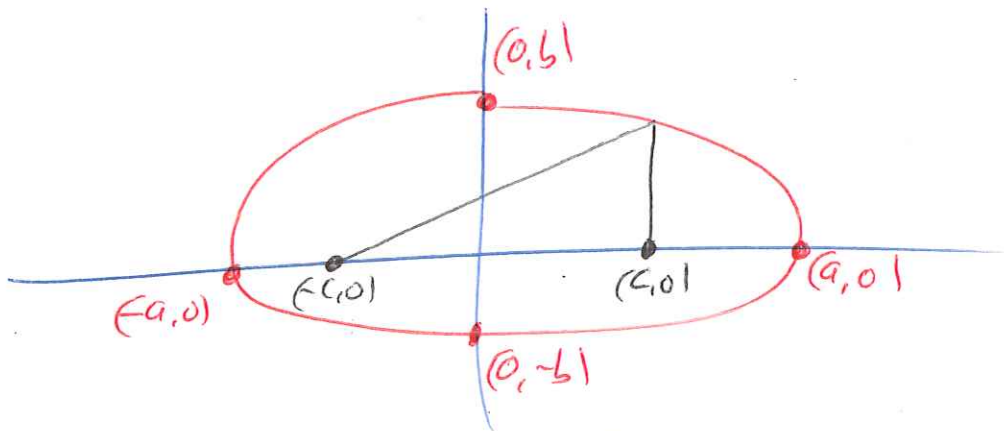
Euclidean answer is like Case 1:
only those points on line segment AB

Taxicab Ellipses

Problem: Find all points P such that the sum of the distances to 2 given points A & B is constant
Foci

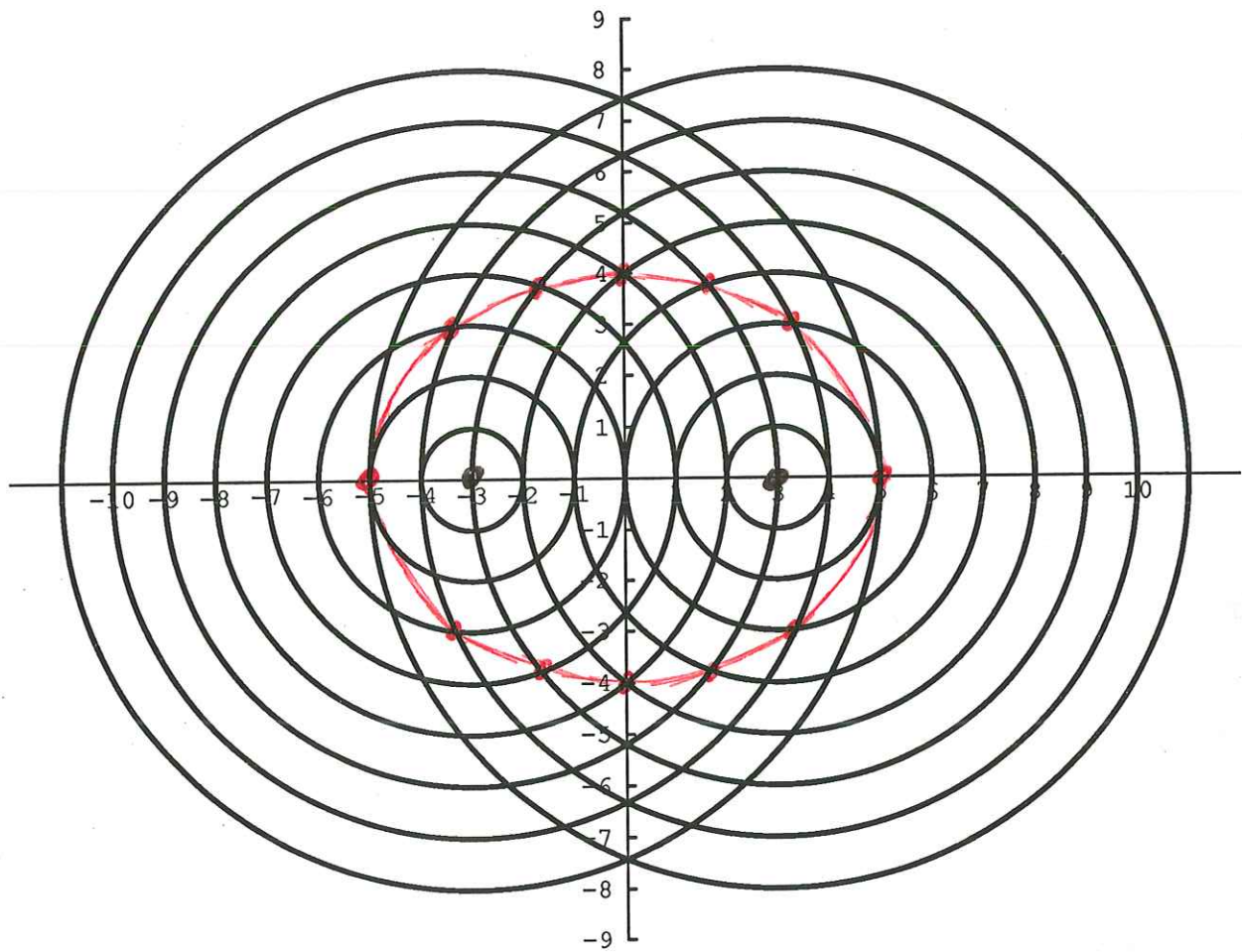
Digression: Euclidean ellipses:

Ex: $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ with $a > b$



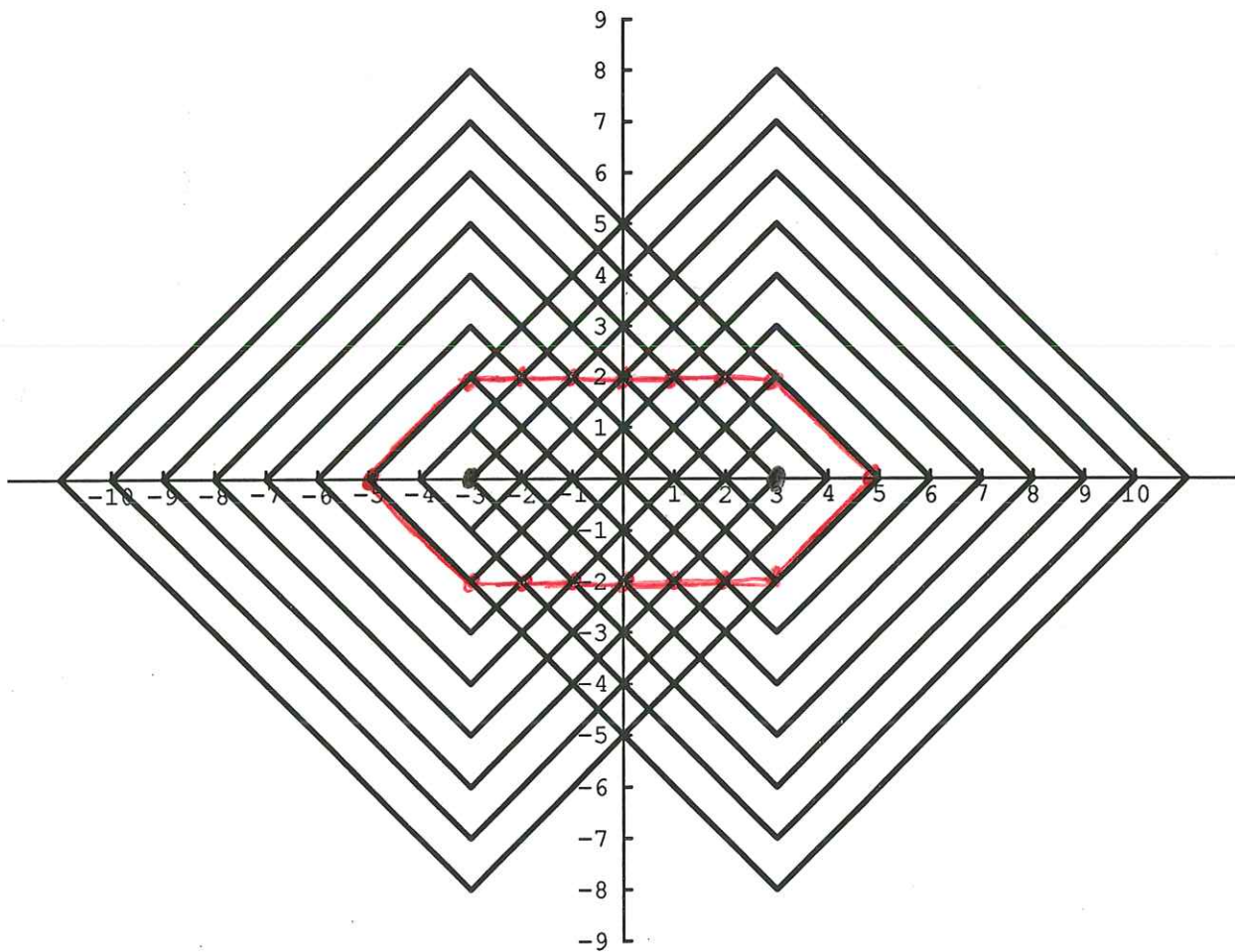
Foci at $(\pm c, 0)$; $c^2 = a^2 - b^2$
distance sum = $2a$

Draw ellipses with same foci
& various distance sums



Foci at $(\pm 3, 0)$

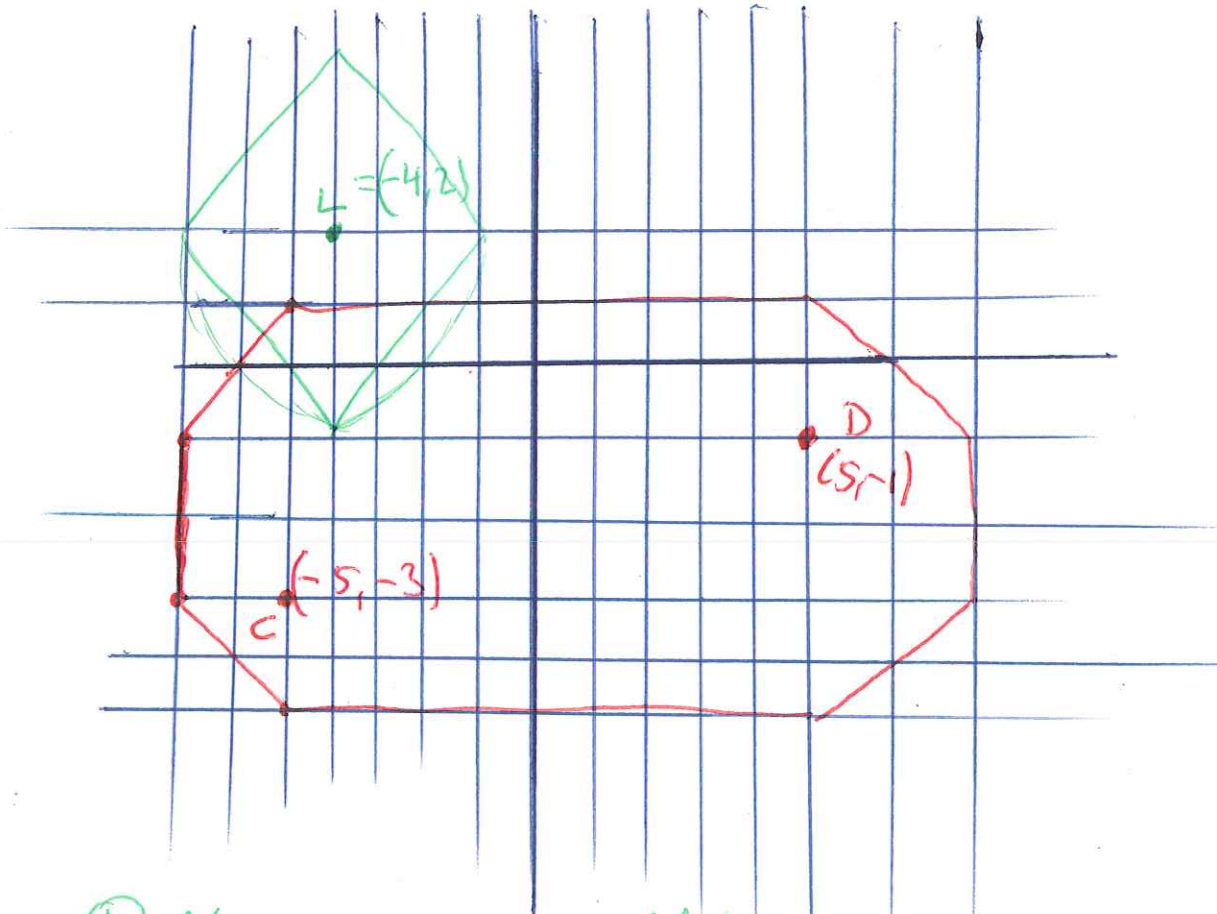
distance sum = 10



Foci at $(\pm 3, 0)$
 distance sum = 10

Problem
63:8

① Build a factory such that sum of distances to railway station C and airport D is ≤ 16 blocks



② Now assume in addition that for noise control, a city ordinance forbids the location of a factory within 3 blocks of the library L