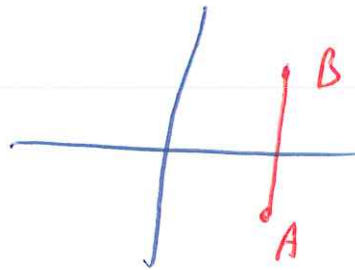
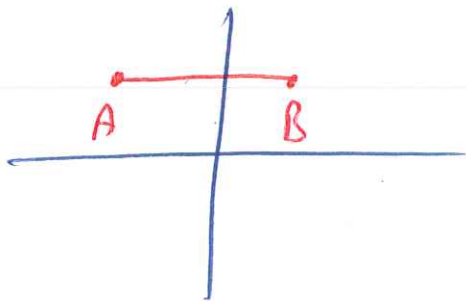


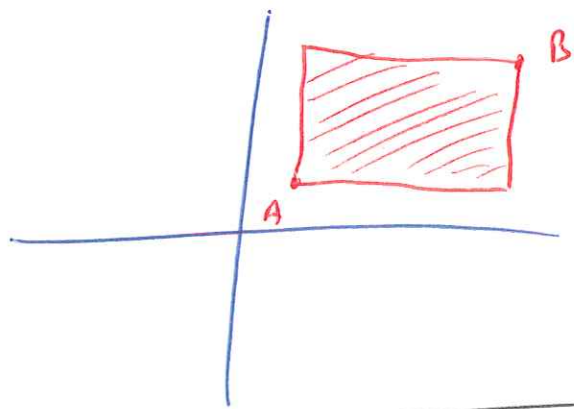
Problem: Find all points  $P$  between  
2 given points  $A$  &  $B$  such that  
$$d(A, P) + d(P, B) = d(A, B)$$

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"



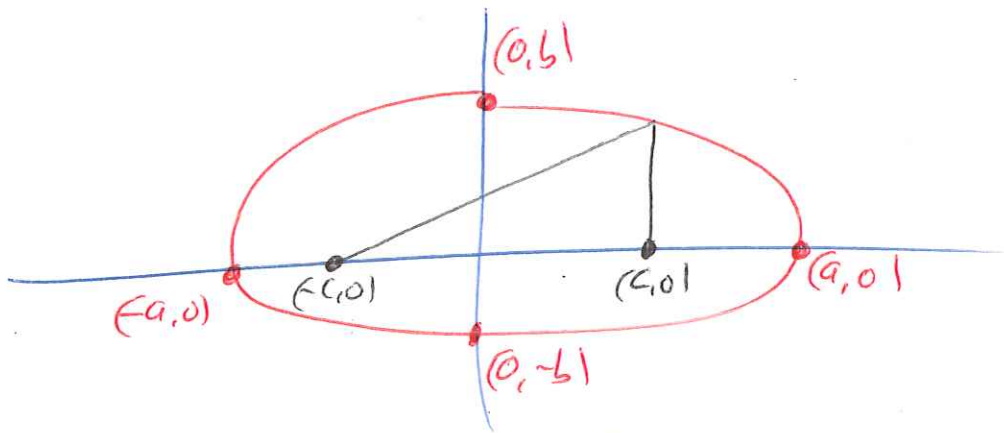
Euclidean answer is like Case 1:  
only those points on line segment  $AB$

# Taxicab Ellipses

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

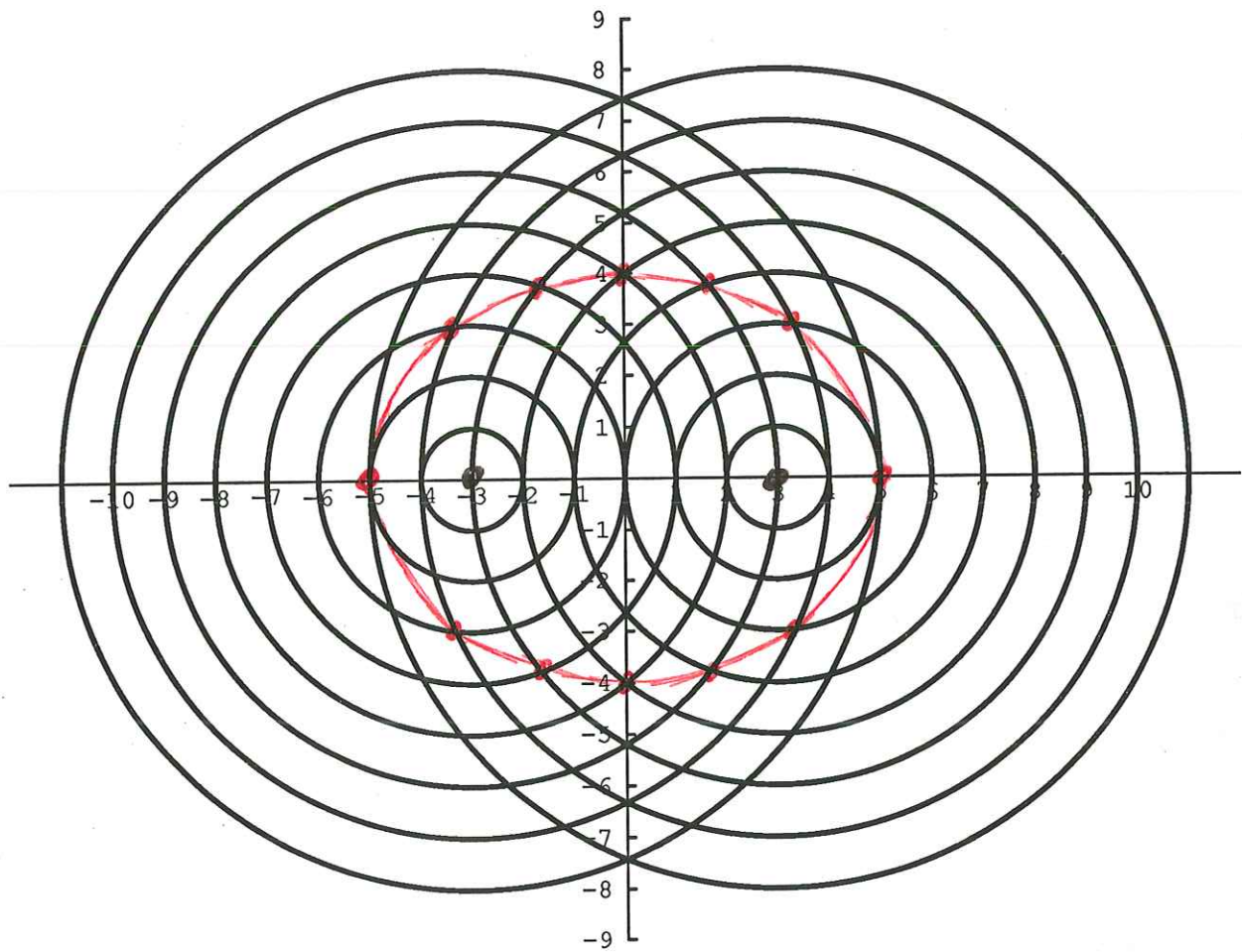
Digression: Euclidean ellipses:

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



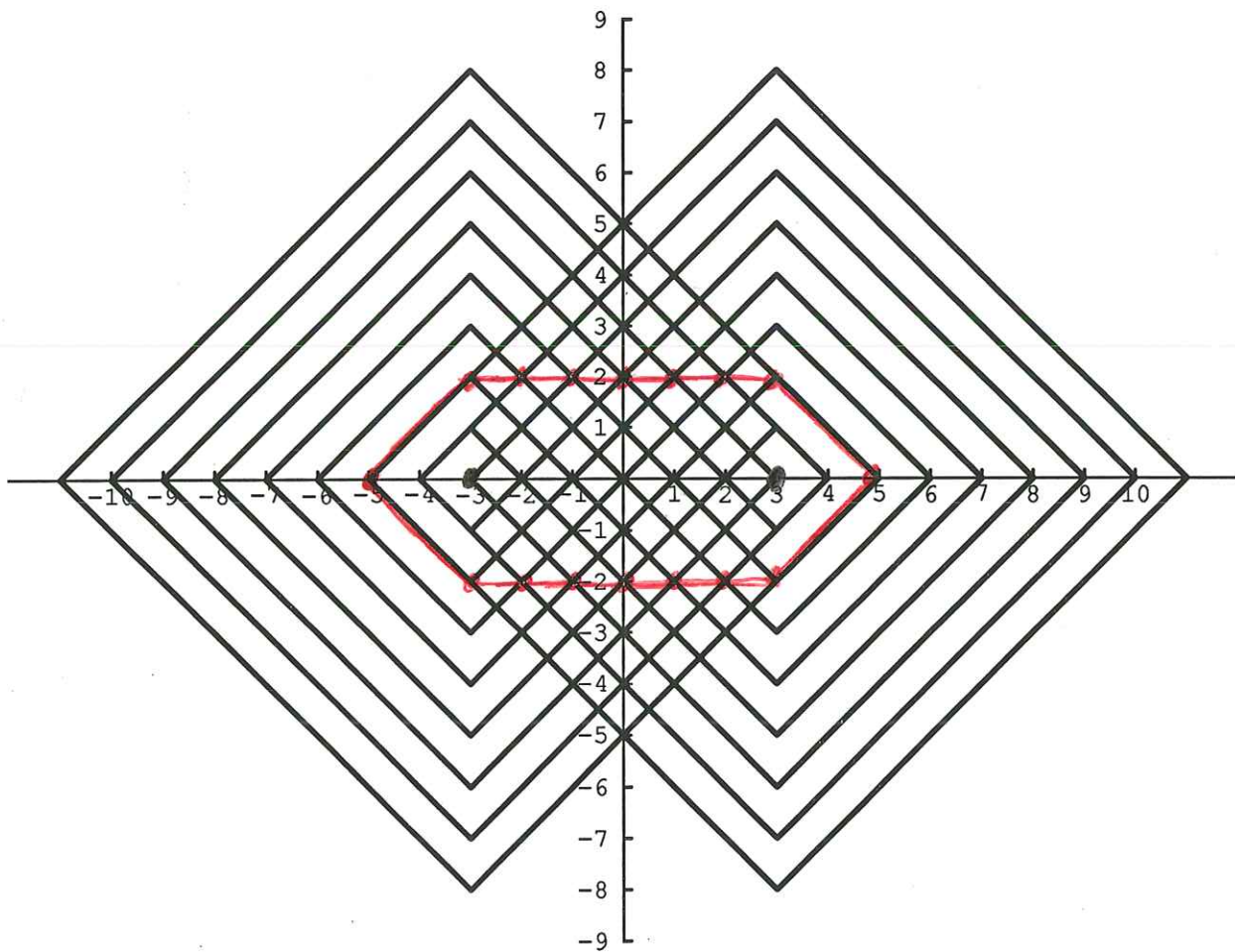
Foci at  $(\pm c, 0)$ ;  $c^2 = a^2 - b^2$   
distance sum =  $2a$

Draw ellipses with same foci  
& various distance sums



Foci at  $(\pm 3, 0)$

distance sum = 10



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