# Taxicab Geometry   Name:

Taxicab Routes

Suppose you live in Taxicab City where all the streets run straight north and south or straight east and west. One night the 911 dispatcher for Taxicab City receives a report of an accident at location x = (−1,4). There are two police cars in the area, car C at (2,1) and car D at (−2,0). Which car should be sent to the scene of the accident to arrive most quickly?
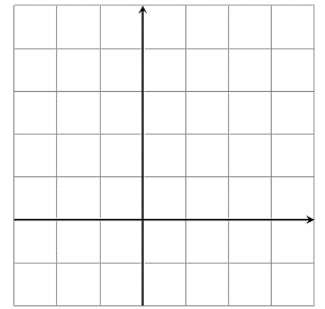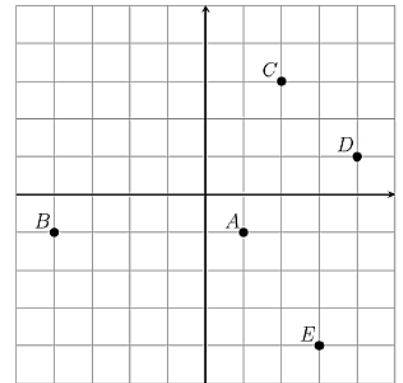
Euclidean vs Taxicab Distances

Consider the points in the graph shown.

a) Calculate the following distances in Euclidean and Taxicab distances (two decimal places).

	Euclidean Distance	Taxicab Distance
from A to B		
from A to C		
from A to D		
from A to E		

b) Is the Euclidean distance between two points always less than or equal to the Taxicab distance? Is it possible for the Euclidean distance to be greater than the Taxicab distance?

c) Given two points A = (a, b) and B = (c, d) write a formula for the Euclidean distance from A to B, denoted by $d(A,B)$. Next, write a formula for the Taxicab distance from A to B denoted by $d_{taxi}(A, B)$.

$d(A, B) =$

$d_{taxi}(A, B) =$

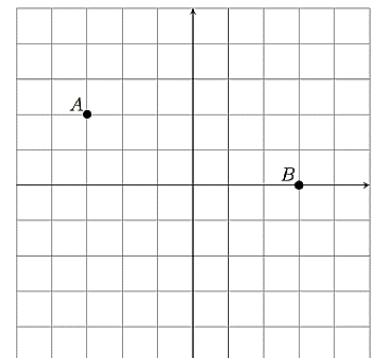Taxicab Distances: Using the Taxicab geometry, consider the points A = (-3, 2) and B = (3, 0).

a) Is the point (-2, -3) closer to A or B?

b) Is the point (1, -2) closer to A or B?

c) Find one point on the graph that is the same distance from A as it is from B. Mark it.

d) Find and mark another such point.

e) Mark all the points on the graph that are equally distant from A to B.

Taxicab Circles

a) In Taxicab City, George works at City Hall located at $M = (1,2)$. He goes out to eat for lunch once a week, but he is usually short on time, so George likes to walk exactly 3 blocks from City Hall to make it back to work on time. Where in the city are restaurants at which George can eat? Draw their locations on the graph.
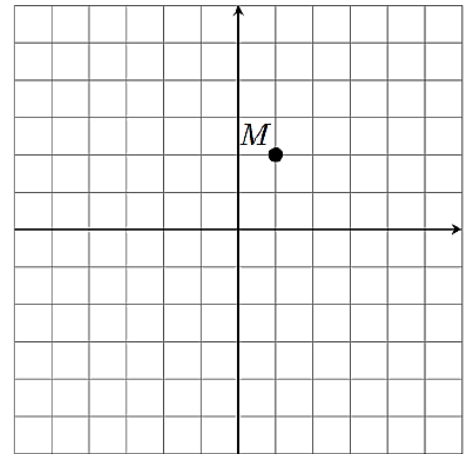
b) On the graph below, draw Taxicab circles around the point $M = (1,2)$ of radii 1, 2, 3, and 4.
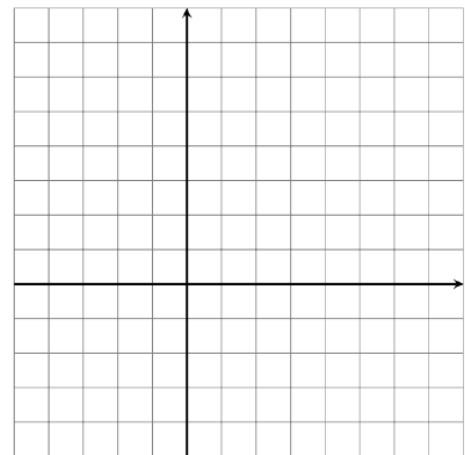
c) Describe a quick technique for drawing a Taxicab circle of radius r around point P.

d) Use your Taxicab circles in part (a) to complete the following table.

radius	Taxicab Circumference	Taxicab Area
1		
2		
3		
4		
Formula:		

e) Complete the definition of π: pi is the ratio of a circle's circumference to its _____.

So, $\pi = \dfrac{circumference}{\rule{3cm}{0.4pt}}$

e) What is the value of π in Taxicab geometry?