

THE STORY SO FAR. . .

Once upon a time, the Queen wanted to know how much land she owned. She hired two surveyors to draw maps of her kingdom.

Anna, the first surveyor, took measurements using a compass and needle, and plotted coordinates east and north of the castle in miles. When she completed her measurements, the following landmarks were given the following coordinates.

Landmark	Distance East (miles)	Distance North (miles)
Watchtower	4	3
Farm	1	7
Blacksmith	5	10
Forest	8	6

Billy, the second surveyor, took measurements using the north star, and plotted coordinates north and east of the castle in miles. When he completed his measurements, the following landmarks were given the following coordinates.

Landmark	Distance East (miles)	Distance North (miles)
Watchtower	5	0
Farm	5	5
Blacksmith	10	5
Forest	10	0

The Queen was upset. She hired two surveyors to make a map, but they can't even agree on where things are! One of them must be wrong. To sort out this mess, the Queen hires you to figure out who's lying.

QUESTIONS

- (1) Use the data provided by Anna and Billy to draw two maps of the Queen's kingdom on the paper provided.
- (2) To check whether Anna or Billy is right, you decide to check if the two surveyors can even agree how far apart things are.
 - (a) What is the straight-line distance from the castle to the Watchtower, according to Anna?
 - (b) What is the straight-line distance from the castle to the Watchtower, according to Billy?
 - (c) What is the straight-line distance from the castle to the Forest, according to Anna?
 - (d) What is the straight-line distance from the castle to the Forest, according to Billy?

- (3) To double check yourself, you also want to measure the distance between the landmarks. Fill out the tables below.

DISTANCE BETWEEN LANDMARKS ACCORDING TO ANNA

	Watchtower	Farm	Blacksmith	Forest
Watchtower				
Farm				
Blacksmith				
Forest				

DISTANCE BETWEEN LANDMARKS ACCORDING TO BILLY

	Watchtower	Farm	Blacksmith	Forest
Watchtower				
Farm				
Blacksmith				
Forest				

(4) Now let's try to figure out which one of these surveyors was right.

(a) Who's lying? Why?

(b) Take one map and place it over the other so that the landmarks are lined up. How did the surveyors end up with different positions for the landmarks?

(5) CHALLENGE. If Anna says that there is a mountain 2 miles west and 11 miles north of the castle, then where does Billy say it is?