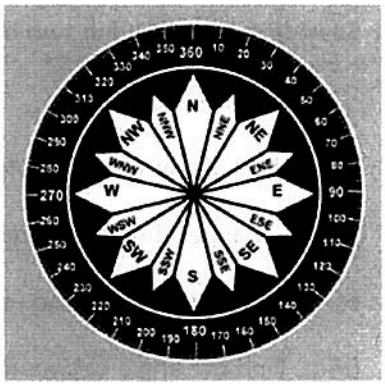
Heading and Bearing Introduction – Notes



When we are measuring direction, we always start from North, since that is how we read a compass. We then read the angles clockwise.

Example 1:

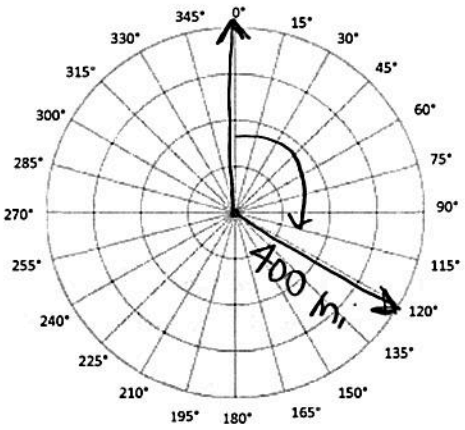
A plane flies on a bearing of 120° at a speed of 200 mph for 2 hours.

Draw a diagram of where it would end up.

$D = rt$

$= 200(2)$

$= 400$ mi



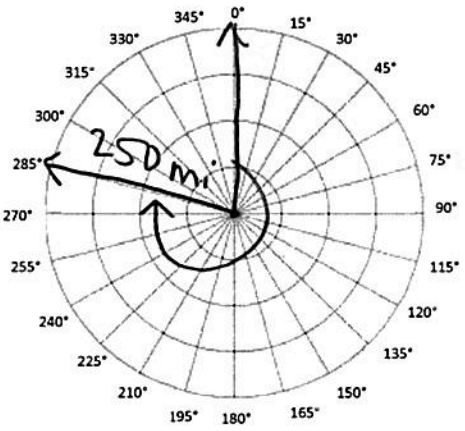
Example 2: A ship is traveling at a bearing of 285° at 50 mph for 5 hours.

Draw a diagram of where it would end up.

$D = rt$

$= 50(5)$

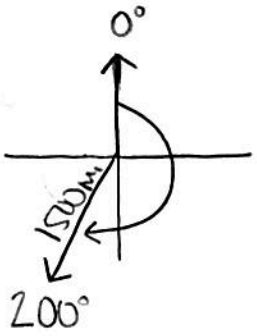
$= 250$ mi



Example 3: An airplane is traveling on a bearing of 200° at 300 mph for 5 hours.

Draw a diagram of where it would end up.

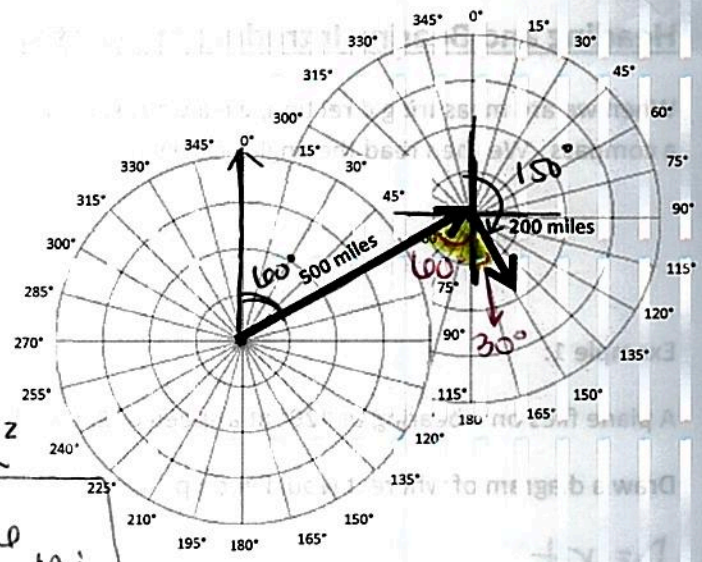
$300(5) = 1500$ mi

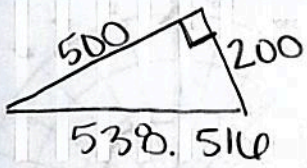


Sometimes, we will put two bearings together.

Example 4: An airplane flies for 500 miles on a bearing of 60°. It then changes directions and flies for 200 miles on a bearing of 150°. Where does it end up?

(Hint: Find the angle between the two paths first)



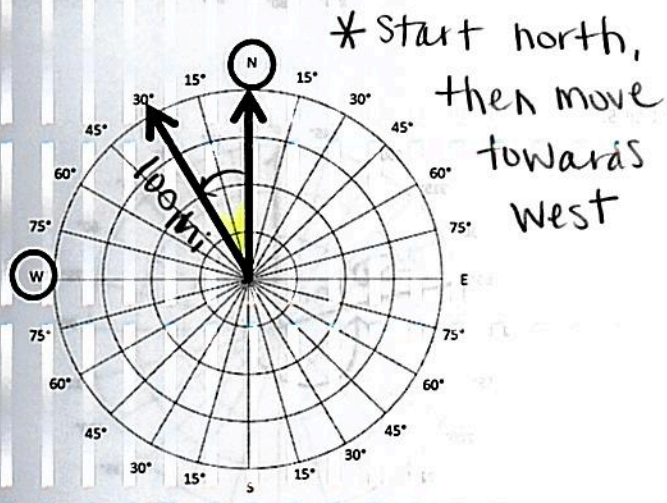


$500^2 + 200^2 = x^2$

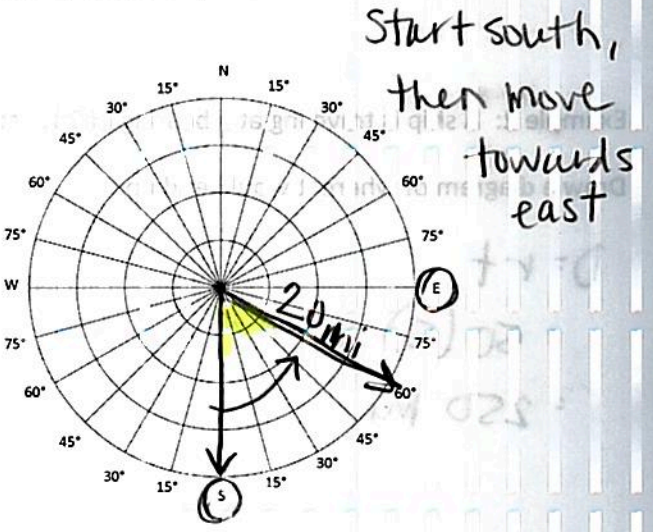
$x \approx 538.516$ Mi

Some navigation problems use the compass directions to describe angles known as headings. All of the angles are acute and measured from either north or south.

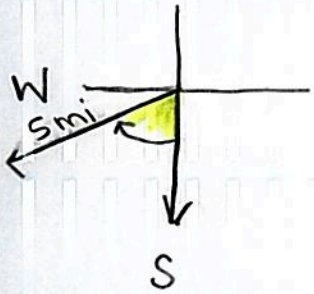
Example 5: John drove N 30° W for 100 miles.



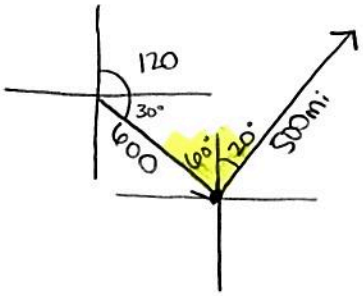
Example 6: Sarah swam for 20 miles S 60° E



Example 7: Azeem walked S 75° W for 5 miles.



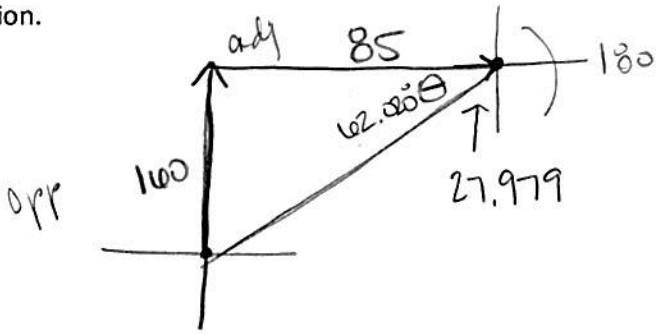
Example 8: A plane flies for 3 hours at a speed of 200 mph on a bearing of 120°, before it changes directions to avoid a storm. It flies for another 2 hours at 250 mph on a heading of 20°. Draw a diagram to represent the situation and then find the angle between the two flight paths.



∡ between:

$60° + 20° = \boxed{80°}$

Example 9: A plane is 160 miles north and 85 miles east of an airport. The pilot wants to fly directly to the airport. What heading/bearing should the pilot take? How far is the plane from the airport? Give answer in both heading and bearing notation.



$\tan\theta = \frac{160}{85}$

$\theta = 62.020$

Bearing of 207.979°

or

Heading of S 27.979° W

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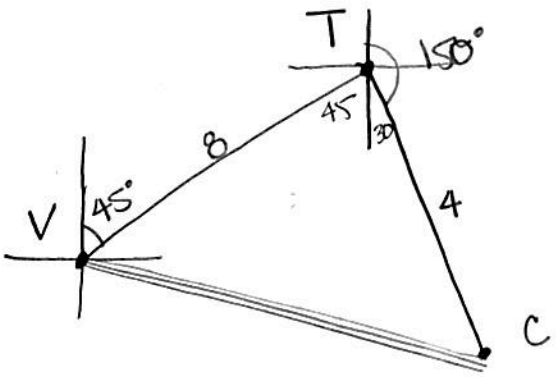
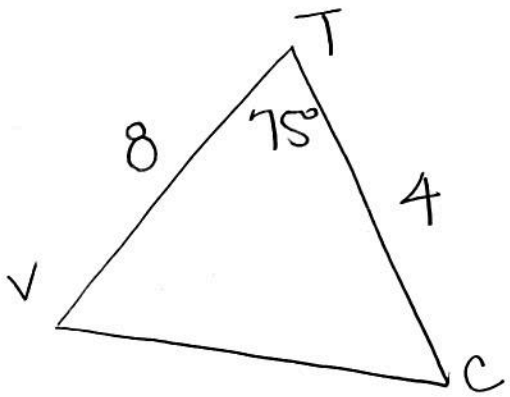
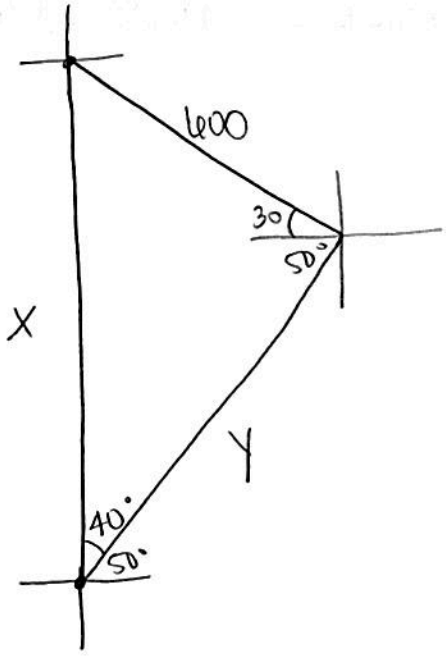
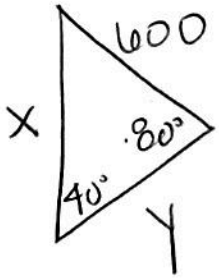
1. Starting point V. Town T is 8 km northeast (N 45° E) of Village V. City C is 4 km from T on a bearing of 150° from T. What is the distance of C from V?



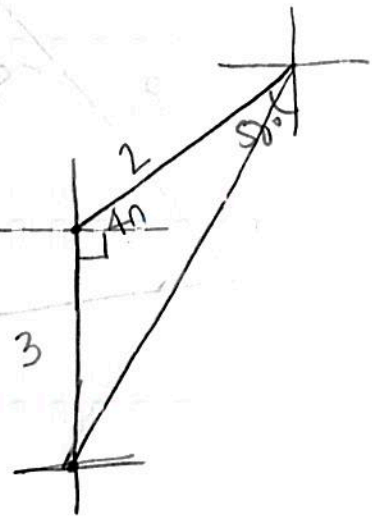


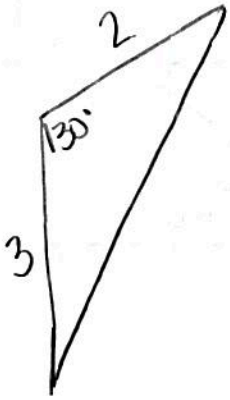
2. A plane flies 600 km on a course of 300°. It then flies directly south for a while and finally flies on a 40° course to return to its starting point. Find the total distance traveled.





3. The contestants from a reality show must run 2 miles in the direction S 50° W then change direction to the south and run the 3 miles to the ending point. At the end of their run, how far are they from the starting point?





4. A ship proceeds on a course of 300° for 2 hours at a speed of 15 nautical miles per hour. Then it changes course to a bearing of 230°, continuing at 15 nautical miles per hour for 3 more hours. At that time how far is the ship form it starting point?

$2(15) = 30$