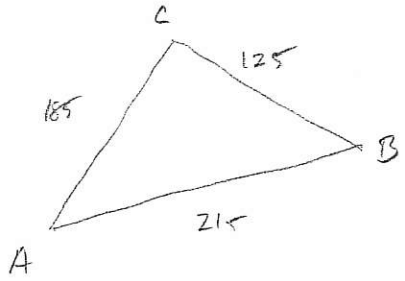
Key

Key Lesson #3 LOC Apps.

Lesson #4 Law of Cosines Applications

1. A triangular lot has sides of 215m, 185m, and 125m. Find the measure of the angles at each of its corners to the nearest tenth.



$215^2 = 185^2 + 125^2 - 2(185)(125)\cos C$

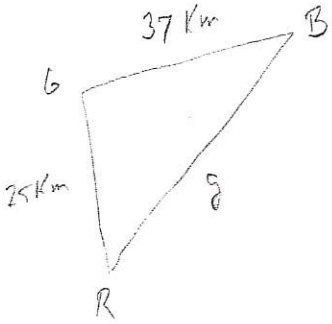
$\angle C = 85.5°$

$\frac{\sin 85.5}{215} = \frac{\sin B}{185}$

$\angle A = 35.4°$

$\angle B = 59.1°$

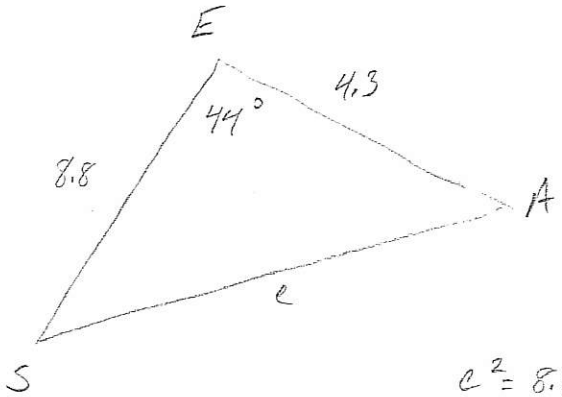
2. The distance from Greenville to Brownville is 37 km, and the distance from Greenville to Red River is 25 km. The angle formed by the roads at Greenville is 42°. The state highway department plans to build a straight road from Brownville to Red River. How long will the road be? Round to the nearest tenth of a kilometer.



$g^2 = 25^2 + 37^2 - 2(25)(37)\cos 42$

$g = 24.9$ Km

3. Sirius and Alpha Centauri are two of the brightest stars. Sirius is 8.8 light years from earth and Alpha Centauri is 4.3 light years from earth. The angle formed by the line of sight from Earth to Sirius and the line of sight from Earth to Alpha Centauri is 44°. Find the distance between Sirius and Alpha Centauri to the nearest tenth of a light year.



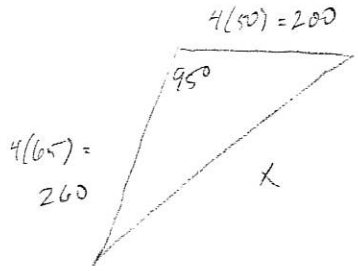
$c = 6.4$ light yr.

$c^2 = 8.8^2 + 4.3^2 - 2(8.8)(4.3)\cos 44$

(go in diff directions)

3

4. Two motorist start out at the same point and travel in two straight courses. The courses diverge by 95°. If one is traveling at 50 mph and the other is traveling at 65 mph, how far apart will they be after 4 hours? Round your answer to the nearest tenth.

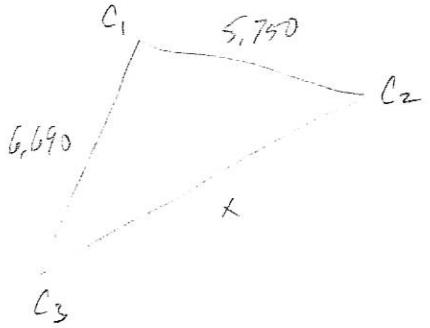


$x^2 = 200^2 + 260^2 - 2(200)(260)\cos 95$

$x = 341.6$ miles

4

5. Suppose that three campers have 2-way radios with a range of 7920 feet. The distance between site 1 and 2 is 5750 feet, the distance between site 1 and 3 is 6690 feet, and the angle formed with site 1 at the vertex is 82°? Can the campers 2 and 3 communicate directly? Why or why not?



$x^2 = 6{,}690^2 + 5{,}750^2 - 2(6690)(5750)\cos 82°$

$x = 8{,}192$ ft → No, they can't communicate w/ each other

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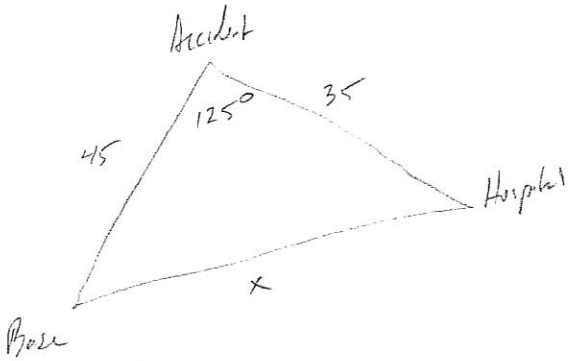
6. A medical rescue helicopter has flown 45 miles from its base to pick up an accident victim and 35 miles from there to the hospital. The angle between the two legs of the trip was 125°. The pilot now needs to know how far he is from the base so he can decide whether to refuel before returning. How far is the hospital from the helicopter base? If the helicopter has 12.25 gallons of fuel remaining and averages 5.5 miles per gallon, does the pilot have enough fuel to return to the base?



$x^2 = 45^2 + 35^2 - 2(45)(35)\cos 125$

$x = 71.1$ miles

$71.1 \text{ mi} \left(\frac{1 \text{ gal}}{5.5 \text{ mi}}\right) = 12.9$ gallons needed

→ Not enough fuel