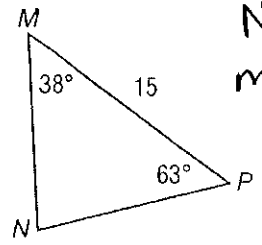
NAME Key DATE PERIOD

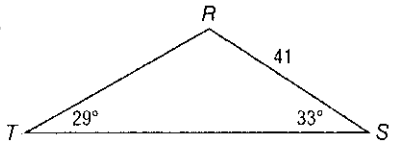
4-7 Word Problem Practice

The Law of Sines and the Law of Cosines

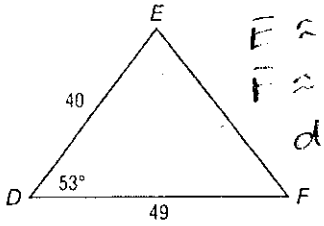
Solve each triangle. Round to the nearest tenth if necessary.

1. 

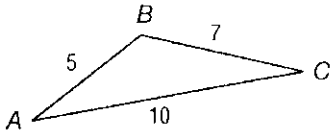
$N = 79°$
$m \approx 9.4$
$p \approx 13.6$

2. 

$R = 118°$
$r \approx 74.7$
$S \approx 46.1$

3. 

$E \approx 75°$
$F \approx 52°$
$d \approx 40.5$

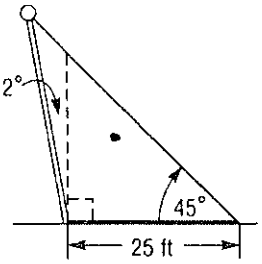
4. 

$A \approx 40.5°$
$B \approx 111.8°$
$C \approx 27.7°$

5. **STREET LIGHTING** A lamp post tilts toward the Sun at a 2° angle from the vertical and casts a 25-foot shadow. The angle from the tip of the shadow to the top of the lamp post is 45°. Find the length of the lamp post.

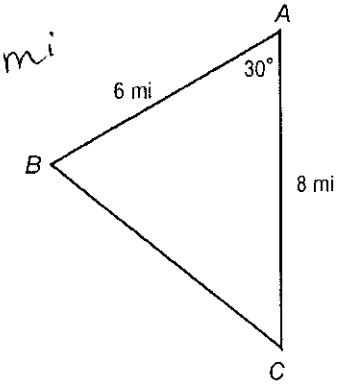
$\frac{\sin 45°}{x} = \frac{\sin 43°}{25}$

25.9 ft



6. **ORIENTEERING** During an orienteering exercise, two hikers start at point A and head in a direction 30° west of south to point B. They hike 6 miles from point A to point B. From point B, they hike to point C and then from point C back to point A, which is 8 miles directly north of point C. How many miles did they hike from point B to point C?

4.1 mi



$x^2 = 6^2 + 8^2 - 2(6)(8)\cos 30°$
$x^2 = 16.86$
$x \approx 4.1$ mi

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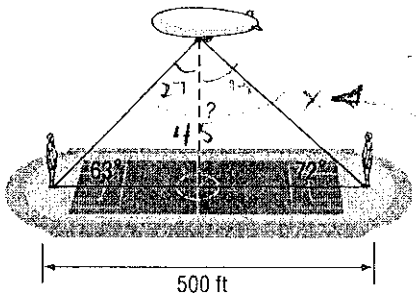
7. BLIMP A blimp hovers over a soccer stadium. Players 500 feet apart at opposite ends of the stadium with the blimp between them measure the respective angles of elevation to the blimp to be 63° and 72°. How high is the blimp?



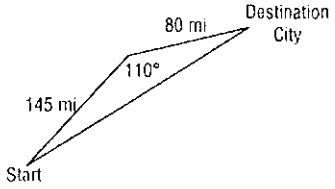
$\frac{\sin 45}{500} = \frac{\sin 63}{x}$

$x = 630$

$\frac{\sin 72}{?} = \frac{\sin 90}{630}$

$? = 599.2$ ft

8. AVIATION Due to weather conditions, an airplane flies in different directions as shown in the diagram.

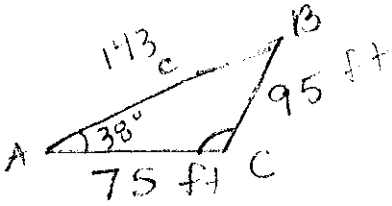


a. How far is the airport from the destination city if the direct route is taken? 188 mi

b. What are the measures of the two other angles in the triangle? 23.6°, 46.4°

9. PROPERTY MAINTENANCE The McSweeneys plan to fence a triangular parcel of their land. One side of the property is 75 feet in length and forms a 38° angle with another side of the property, which has not yet been measured. The remaining side of the property is 95 feet in length. Approximate to the nearest tenth the length of fence needed to enclose this parcel of the McSweeneys' lot.

312 ft = 143 + 95 + 75



$\frac{\sin 38}{95} = \frac{\sin B}{75}$

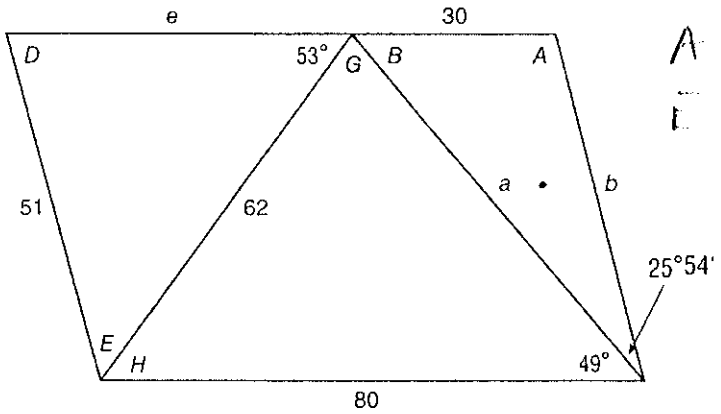
$B = 29°$

$C = 112°$

$\frac{\sin 38}{95} = \frac{\sin 112}{c}$

$c = 143$ ft

Triangle Challenge A surveyor took the following measurements from two irregularly shaped pieces of land. Some of the lengths and angle measures are missing. Find all missing lengths and angle measures. Round lengths to the nearest tenth and angle measures to the nearest minute.



$a = 66.7$ $b = 52.7$ $c = 49.5$

$A = 103.97°$ $B = 50.13°$ $D = 76.13°$

$E = 50.87°$ $G = 76.87°$ $H = 54.13°$