

**Read instructions for each section carefully. Round all answers to the nearest tenth.**

**Part I.** Solve the given triangle. Circle your final answers, with side or angle the measurement corresponds to clearly indicated. If there is no solution, state this. If there is more than one solution, make sure to clearly indicate which answers go together.

1.  $A = 42^\circ$  ,  $a = 2$  ,  $b = 9$

2.  $a = 8$  ,  $c = 5$  ,  $C = 23^\circ$

**Part II.** Find only the requested side or angle. Circle your final answer, with side or angle the measurement corresponds to clearly indicated. If there is no solution, state this. If there is more than one solution, circle both.

3.  $B = 38^\circ$  ,  $C = 21^\circ$  ,  $b = 23$  ; Find side  $c$ .

4.  $A = 131^\circ$  ,  $C = 23^\circ$  ,  $b = 10$  ; Find side  $a$ .

5.  $a = 12$  ,  $b = 14$  ,  $c = 20$  ; Find angle  $B$ .

6.  $a = 15$  ,  $c = 7$  ,  $B = 62^\circ$  ; Find side  $b$ .

**Part III.** Find the area of the given triangle. Your answer must include appropriate units.

7.  $B = 42^\circ$  ,  $a = 7.2 \text{ ft}$  ,  $c = 3.4 \text{ ft}$

8.  $A = 135.2^\circ$  ,  $b = 46.12 \text{ ft}$  ,  $c = 36.74 \text{ ft}$

**Part IV.** Find the distance or angle requested in the word problem by using the law of sines or cosines. Your answer must include appropriate units.

9. A navigator on a ship sights a lighthouse at a bearing of  $N35^\circ E$ . After traveling 9 miles at a heading of  $340^\circ$ , the ship sights the lighthouse at a bearing of  $S80^\circ E$ . How far is the ship from the lighthouse at the second sighting? *Hint: recall that heading is measured clockwise from north, and that  $N35^\circ E$  is read as "35 degrees east of north."*

10. A regular pentagon is inscribed in a circle with a radius of 20 inches. Find the length of one side of the pentagon.

**Bonus:** The sides of a parallelogram are 28 centimeters and 40 centimeters. The shorter diagonal of the parallelogram is 48 centimeters. Find the length of the longer diagonal of the parallelogram. *Hint: The diagonals of a parallelogram bisect one another.*