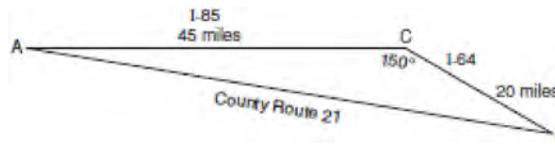
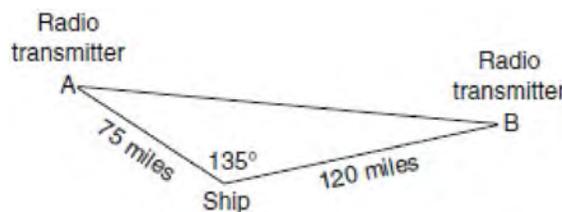


**A2.A.73: Law of Cosines 6: Solve for an unknown side or angle, using the Law of Sines or the Law of Cosines**

- 1 In a triangle, two sides that measure 6 cm and 10 cm form an angle that measures  $80^\circ$ . Find, to the *nearest degree*, the measure of the smallest angle in the triangle.
- 2 In a triangle, two sides that measure 8 centimeters and 11 centimeters form an angle that measures  $82^\circ$ . To the *nearest tenth of a degree*, determine the measure of the *smallest* angle in the triangle.
- 3 Kieran is traveling from city  $A$  to city  $B$ . As the accompanying map indicates, Kieran could drive directly from  $A$  to  $B$  along County Route 21 at an average speed of 55 miles per hour or travel on the interstates, 45 miles along I-85 and 20 miles along I-64. The two interstates intersect at an angle of  $150^\circ$  at  $C$  and have a speed limit of 65 miles per hour. How much time will Kieran save by traveling along the interstates at an average speed of 65 miles per hour?

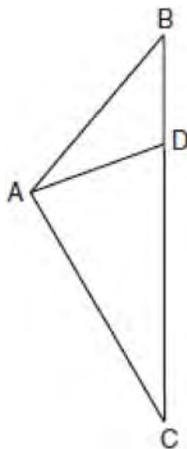


- 4 As shown in the accompanying diagram, a ship at sea is 75 miles from radio transmitter  $A$  and 120 miles from radio transmitter  $B$ . The angle between the signals sent to the ship by the two transmitters measures  $135^\circ$ .



Find the distance between the transmitters to the *nearest mile*. Using this answer, find the measure of angle  $B$  to the *nearest degree*.

- 5 In  $\triangle ABC$ , side  $a = 13$ , side  $b = 25$ , and  $m\angle C = 53.8$ . Find the length of side  $c$  to the *nearest tenth*. Using this answer, find  $m\angle A$  to the *nearest degree*.
- 6 In  $\triangle ABC$ ,  $AB = 14$ ,  $AC = 20$ , and  $m\angle CAB = 49$ . Find the length of  $\overline{BC}$  to the *nearest tenth*. Using this length, find  $m\angle C$  to the *nearest degree*.
- 7 In triangle  $RST$ ,  $RS = 50$ ,  $ST = 58$ , and  $m\angle S = 46$ . Find  $RT$ , to the *nearest tenth*. Using your value for  $RT$ , find  $m\angle R$ , to the *nearest degree*.
- 8 In the accompanying diagram of  $\triangle ABC$ ,  $AB = 12$  feet,  $DC = 17$  feet,  $m\angle ABD = 40$ , and  $m\angle ADB = 110$ . Find  $AC$  to the *nearest foot*.



- 9 In parallelogram  $ABCD$ ,  $AB = 14$ ,  $BC = 20$ , and  $m\angle B = 54$ . Find, to the *nearest tenth*, the length of diagonal  $\overline{BD}$ . Find  $m\angle DBC$  to the *nearest degree*.

**A2.A.73: Law of Cosines 6: Solve for an unknown side or angle, using the Law of Sines or the Law of Cosines**

**Answer Section**

1 ANS:

$$33. a = \sqrt{10^2 + 6^2 - 2(10)(6)\cos 80} \approx 10.7. \angle C \text{ is opposite the shortest side. } \frac{6}{\sin C} = \frac{10.7}{\sin 80}$$

$$C \approx 33$$

REF: 061039a2

2 ANS:

$$a = \sqrt{8^2 + 11^2 - 2(8)(11)\cos 82} \approx 12.67. \text{ The angle opposite the shortest side: } \frac{8}{\sin x} = \frac{12.67}{\sin 82}$$

$$x \approx 38.7$$

REF: 081536a2

3 ANS:

9 minutes

REF: 060232b

4 ANS:

181, 17

REF: 010442siii

5 ANS:

20.3, 31

REF: 060341siii

6 ANS:

15.1, 44

REF: 069741siii

7 ANS:

$$s = \sqrt{50^2 + 58^2 - 2(50)(58)\cos 46} \approx 42.8. \frac{42.8}{\sin 46} = \frac{58}{\sin R}$$

$$R \approx 77$$

REF: 061033b

8 ANS:

16

REF: 010139siii

9 ANS:

30.4, 22

REF: 089840siii