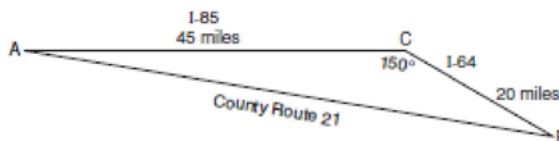
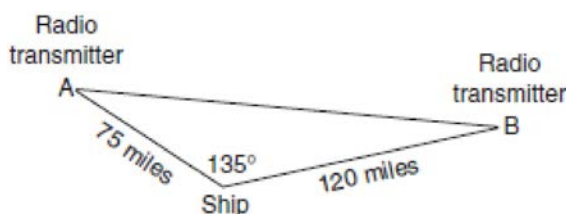


A2.A.73: Law of Cosines 6: Solve for an unknown side or angle, using the Law of Sines or the Law of Cosines

- 1 In a triangle, two sides that measure 6 cm and 10 cm form an angle that measures 80° . 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° . 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° 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?

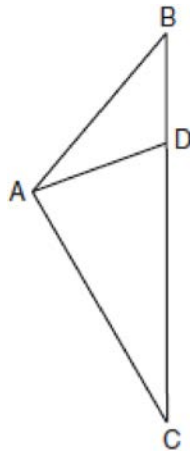


- 4 As shown in the accompanying diagram, a ship at sea is 75 miles from radio transmitter A and 120 miles from radio transmitter B . The angle between the signals sent to the ship by the two transmitters measures 135° .



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