A2.A.73: Law of Cosines 7: Solve for an unknown side or angle, using the Law of Sines or the Law of Cosines

1 In $\triangle ABC$, $a = 10$, $b = 12$, and the measure of angle C is 41°30'. Find the length of side c to the *nearest integer*. Find the area of $\triangle ABC$ to the *nearest tenth.*

2 In $\triangle ABC$, $m\angle A = 42°20'$, $AC = 2.0$ feet and $AB = 18$ inches. Find BC to the *nearest tenth.* [*Indicate the unit of measure*.] Find the area of $\triangle ABC$ to the *nearest tenth.* [*Indicate the unit of measure*.]

3 A surveyor is mapping a triangular plot of land. He measures two of the sides and the angle formed by these two sides and finds that the lengths are 400 yards and 200 yards and the included angle is 50°. What is the measure of the third side of the plot of land, to the *nearest yard*? What is the area of this plot of land, to the *nearest square yard*?

4 In $\triangle ABC$, $AB = 15$ cm, $BC = 10$ cm, and $AC = 6$ cm. Find the measure of angle B to the *nearest degree.* Using this angle, find the area of $\triangle ABC$ to the *nearest square centimeter*.

5 The sides of a triangular plot of land are 50, 80, and 100 meters. Find, to the *nearest degree,* the measure of the largest angle of the triangle. Using this answer, find the area of the triangle to the *nearest square meter.*

6 Find, to the *nearest degree*, the measure of the largest angle of a triangle whose sides measure 22, 34, and 50. Find, to the *nearest integer*, the area of this triangle.

7 The sides of a triangle have lengths 58, 92, and 124. Find, to the *nearest ten minutes*, the largest angle of the triangle. Find, to the *nearest integer*, the area of the triangle.

8 The lengths of the sides of $\triangle ABC$ are 9.5, 12.8, and 13.7. Find, to the *nearest hundredth of a degree* or the *nearest ten minutes*, the measure of the smallest angle in the triangle. Find, to the *nearest tenth*, the area of $\triangle ABC$.

9 In $\triangle ABC$, $a = 6$, $b = 7$, and $c = 10$. Find the measure of angle A to the *nearest ten minutes* or *nearest tenth of a degree*. Using this measure, find the area of $\triangle ABC$ to the *nearest tenth*.

10 In $\triangle ABC$, $AC = 8$, $BC = 17$, and $AB = 20$. Find the measure of the largest angle to the *nearest degree*. Find the area of $\triangle ABC$ to the *nearest integer.*

11 A hiking trail is planned in the shape of a triangle with sides 2.3 miles, 8.1 miles, and 6.2 miles. Find, to the *nearest tenth of a degree* or the *nearest ten minutes,* the angle between the 2.3-mile side and the 6.2-mile side. Find the area of the triangle to the *nearest tenth of a square mile.*

12 Firefighters dug three trenches in the shape of a triangle to prevent a fire from completely destroying a forest. The lengths of the trenches were 250 feet, 312 feet, and 490 feet. Find, to the *nearest degree*, the *smallest* angle formed by the trenches. Find the area of the plot of land within the trenches, to the *nearest square foot*.

13 Two adjacent sides of a parallelogram are 10 and 12 centimeters. The angle included between these sides has a measure of 60°. Find, to the *nearest centimeter*, the length of the shorter diagonal of the parallelogram. What is the area of the parallelogram to the *nearest square centimeter*?

14 In parallelogram $ABCD$, $AB = 12$ cm, $AD = 20$ cm, and $m\angle A = 50$. Find the length of the longer diagonal of the parallelogram to the *nearest centimeter.* Find the area of the parallelogram to the *nearest square centimeter*.

15 Two consecutive sides of a parallelogram are 8 centimeters and 10 centimeters, respectively. If the length of the longer diagonal of the parallelogram is 14 centimeters, find the measure of the largest angle of the parallelogram to the *nearest degree*. Using your answer, find the area of the parallelogram to the *nearest square centimeter*.

16 In parallelogram $ABCD$, $AD = 8$, $AB = 12$, and diagonal $BD = 15$. Find $\angle BAD$ to the *nearest degree*. Using this angle, find the area of parallelogram $ABCD$ to the *nearest tenth*.

A2.A.73: Law of Cosines 7: Solve for an unknown side or angle, using the Law of Sines or the Law of Cosines
Answer Section

1 ANS:
8, 39.8

PTS: 6 REF: 018438siii

2 ANS:
16.2 in or 1.3 ft, 145.5 in^2 or 1.0 ft^2

PTS: 10 REF: 019538siii

3 ANS:
312, 30,642

PTS: 6 REF: 060434b

4 ANS:
16, 21

PTS: 10 REF: 068539siii

5 ANS:
98, 1981

PTS: 10 REF: 089040siii

6 ANS:
125, 306

PTS: 10 REF: 069539siii

7 ANS:
109°30′, 2515

PTS: 10 REF: 089541siii

8 ANS:
41.84º or 41º50’, 58.5

PTS: 10 REF: 069642siii

9 ANS:
36.2 or 36°10', 20.7

PTS: 10 REF: 019941siii

10 ANS:
100, 67

PTS: 10 REF: 019940siii

11 ANS:
140.1º or 140º10’, 4.6

PTS: 6 REF: 010340siii

12 ANS:
26 and 33,509 or 33,443

PTS: 6 REF: 080934b

13 ANS:
11, 104

PTS: 10 REF: 088541siii

14 ANS:
29, 184

PTS: 10 REF: 068739siii

15 ANS:
102, 78

PTS: 10 REF: 068039siii

16 ANS:
95, 95.6

PTS: 10 REF: 010038siii