

A2.A.73: Law of Sines 3: Solve for an unknown side or angle, using the Law of Sines or the Law of Cosines

- 1 In $\triangle ABC$, $m\angle A = 53$, $m\angle B = 14$, and $a = 10$. Find b to the nearest integer.

- 2 In $\triangle FUN$, $f = 4$, $m\angle F = 26$, and $m\angle N = 67$. Find the value of n to the nearest integer.

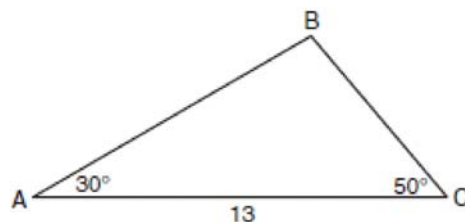
- 3 In $\triangle ABC$, $m\angle A = 30$, $m\angle B = 65$, and $BC = 10$. Find AC to the nearest tenth.

- 4 In $\triangle ABC$, $m\angle A = 35$, $m\angle B = 82$, and side $a = 4$ inches. Find the length of side b to the nearest tenth of an inch.

- 5 In $\triangle ABC$, $m\angle A = 35$, $m\angle C = 60$, and $AC = 12$ meters. Find the length of BC to the nearest meter.

- 6 The Vietnam Veterans Memorial in Washington, D.C., is made up of two walls, each 246.75 feet long, that meet at an angle of 125.2° . Find, to the nearest foot, the distance between the ends of the walls that do not meet.

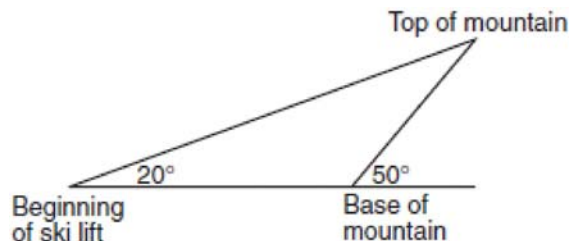
- 7 In the accompanying diagram of $\triangle ABC$, $m\angle A = 30$, $m\angle C = 50$, and $AC = 13$.



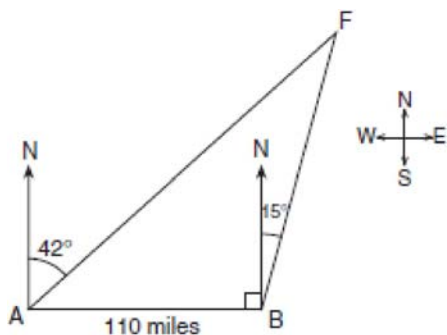
What is the length of side \overline{AB} to the nearest tenth?

- 1) 6.6
- 2) 10.1
- 3) 11.5
- 4) 12.0

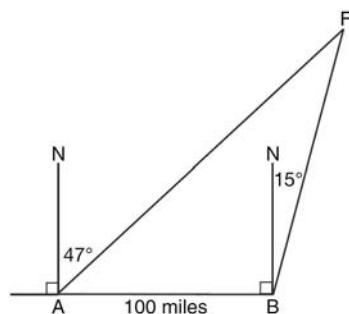
- 8 A ski lift begins at ground level 0.75 mile from the base of a mountain whose face has a 50° angle of elevation, as shown in the accompanying diagram. The ski lift ascends in a straight line at an angle of 20° . Find the length of the ski lift from the beginning of the ski lift to the top of the mountain, to the nearest hundredth of a mile.



- 9 As shown in the accompanying diagram, two tracking stations, A and B , are on an east-west line 110 miles apart. A forest fire is located at F , on a bearing 42° northeast of station A and 15° northeast of station B . How far, to the *nearest mile*, is the fire from station A ?



- 10 As shown in the diagram below, fire-tracking station A is 100 miles due west of fire-tracking station B . A forest fire is spotted at F , on a bearing 47° northeast of station A and 15° northeast of station B . Determine, to the *nearest tenth of a mile*, the distance the fire is from *both* station A and station B . [N represents due north.]



- 11 In $\triangle ABC$, $\sin A = 0.4293$, $\sin C = 0.4827$, and $a = 34.5$ centimeters. Find, to the *nearest tenth* of a centimeter, the measure of c .
- 12 In $\triangle ABC$, $m\angle A = 33$, $a = 12$, and $b = 15$. Find $\sin B$ to the *nearest thousandth*.
- 13 In $\triangle ABC$, $m\angle A = 33$, $a = 12$, and $b = 15$. What is $m\angle B$ to the *nearest degree*?
- 41
 - 43
 - 44
 - 48
- 14 In triangle ABC , $a = 15$, $c = 20$, and $m\angle C = 100$. Find the measure of angle A to the *nearest degree*.
- 15 In acute triangle ABC , side $a = 10$, side $b = 12$, and $m\angle A = 42$. Find $m\angle B$ to the *nearest degree*.
- 16 In $\triangle ABC$, $m\angle A = 32$, $a = 12$, and $b = 10$. Find the measures of the missing angles and side of $\triangle ABC$. Round each measure to the *nearest tenth*.

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Answer Section

1 ANS:
3

REF: 060622b

2 ANS:
8

REF: 010109siii

3 ANS:
18.1

REF: 060211siii

4 ANS:
6.9

REF: 080304siii

5 ANS:
7

REF: 010205siii

6 ANS:
438

REF: 010631b

7 ANS: 2 REF: 080214b

8 ANS:
1.15

REF: 080421b

9 ANS:
234

REF: 060527b

10 ANS:

$$\frac{100}{\sin 32} = \frac{b}{\sin 105} \cdot \frac{100}{\sin 32} = \frac{a}{\sin 43}$$

$$b \approx 182.3 \quad a \approx 128.7$$

REF: 011338a2

11 ANS:
38.8

REF: 019504siii

12 ANS:
0.681

REF: 019911siii

13 ANS: 2 REF: 010212b

14 ANS:
48

REF: 068442siii

15 ANS:
53

REF: 010313siii

16 ANS:

$$\frac{12}{\sin 32} = \frac{10}{\sin B} \quad . \quad C \approx 180 - (32 + 26.2) \approx 121.8. \quad \frac{12}{\sin 32} = \frac{c}{\sin 121.8}$$

$$B = \sin^{-1} \frac{10 \sin 32}{12} \approx 26.2 \quad c = \frac{12 \sin 121.8}{\sin 32} \approx 19.2$$

REF: 011137a2