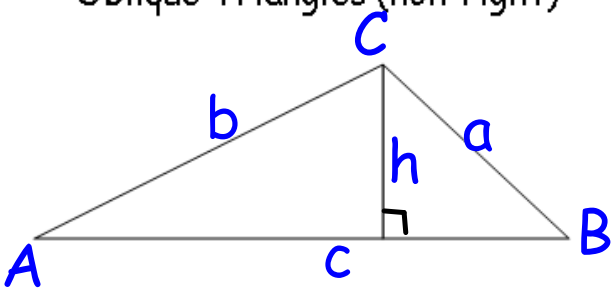
Unit 9 - Law of Sines and Law of Cosines

Test - Law of Sines

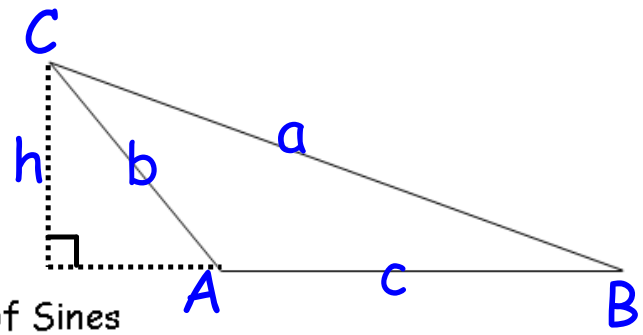
Quiz - Law of Cosines

Test - Combined

Oblique Triangles (non-right)



Law of Sines



Law of Sines

In any triangle, the sines of the angles are proportional to the opposite sides.

side a / sinA = side b / sinB = side c / sinC

Or

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

Adv. Alg.-Trig.
Homework #9.1

HW 9.2

Test on Law of Sines Next Wednesday!

1) 20

2) $\frac{5}{6}$

3) a = 16, b = $16\sqrt{3}$(27.7)

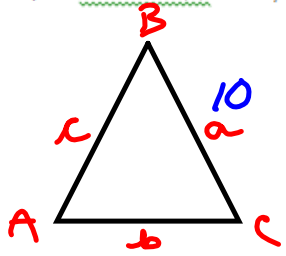
4) a = 66, c = 79

5) 61

6) 54

7) 24ft

1) In triangle ABC, $a = 10$, $\sin A = .30$, and $\sin B = \frac{3}{5}$. Find b.



$\frac{a}{\sin A} = \frac{b}{\sin B}$

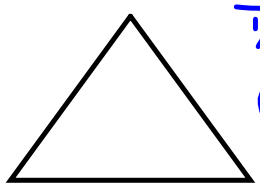
$\frac{10}{.30} = \frac{b}{3/5}$

$10 \cdot \frac{3}{5} = .30b$

$\frac{6}{.30} = \frac{.30b}{.30}$

$b = 20$

2) In triangle ABC, $a = 6$, $\sin A = \frac{1}{4}$, and $b = 20$. Find $\sin B$.

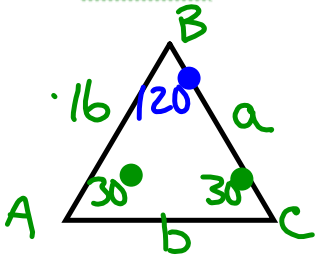


$\frac{6}{1/4} = \frac{20}{\sin B}$

$\frac{6 \sin B}{6} = \frac{5}{6}$

$\sin B = \frac{5}{6}$

3) In triangle ABC, $\angle A = 30°$, $\angle C = 30°$, and $c = 16$. Find a and b.



$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

$\frac{16}{\sin 30} = \frac{a}{\sin 30}$

$\frac{a \sin 30}{\sin 30} = \frac{16 \sin 30}{\sin 30}$

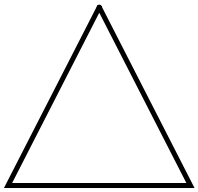
$a = 16$

$\frac{b}{\sin 120} = \frac{16}{\sin 30}$

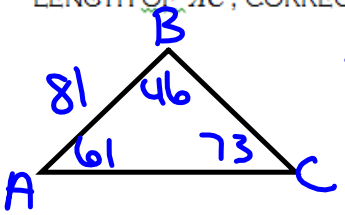
$b = \frac{16 \cdot \sin 120}{\sin 30}$

$b = 27.7$

4) IN TRIANGLE ABC, $\angle A = 48°$, $\angle C = 62°$, AND $b = 84\,feet$. FIND a AND c TO THE NEAREST FOOT.



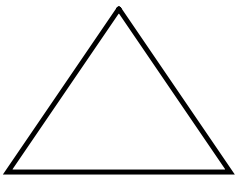
5) IN TRIANGLE ABC, $AB = 81\,feet$, $\angle A = 61°$, AND $\angle C = 73°$. FIND THE LENGTH OF AC, CORRECT TO THE NEAREST FOOT.



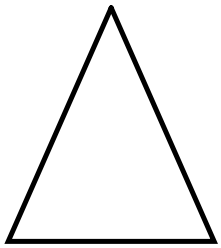
$\frac{AC}{\sin 46} = \frac{81}{\sin 73}$

$AC = 61$

6) IN TRIANGLE ABC, $AB = 50$, $\angle A = 71°$, AND $\angle C = 49°$. FIND THE LENGTH OF THE ALTITUDE ON AB, CORRECT TO THE NEAREST INTEGER.

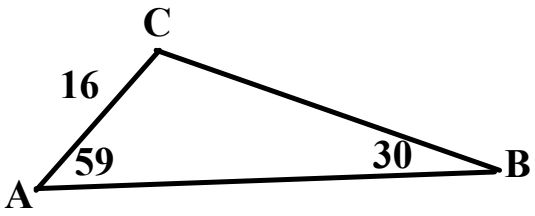


7) Two angles of a triangle are 25° and 70° and the longest side is 56 feet. Find the shortest side, correct to the nearest foot.

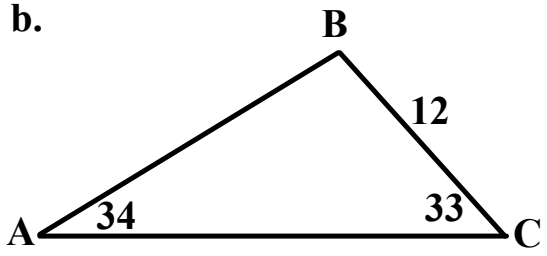


Warm-Up

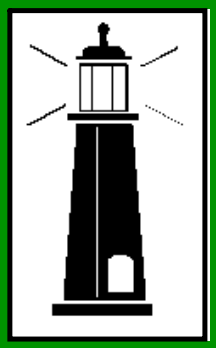
1) Find a.



2) Find b.



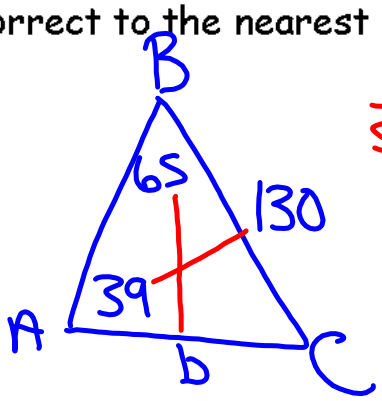
Law of Sines Word Problems



Law of Sines Word Problems

Problem #1

In Triangle ABC, a = 130 feet, angle A = 39°, angle B = 65°. Find side b, correct to the nearest 10 feet.



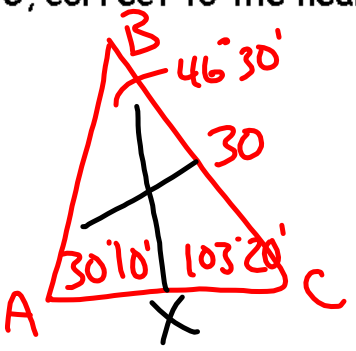
$\frac{b}{\sin 65} = \frac{130}{\sin 39}$

$b = 187.2$

$b = 190$ ft.

Problem #2

In Triangle ABC, BC = 30 feet, angle A = 30°10′, and angle C = 103°20′. Find AC, correct to the nearest foot.



$$\frac{30}{\sin 30^\circ 10'} = \frac{AC}{\sin 46^\circ 30'}$$

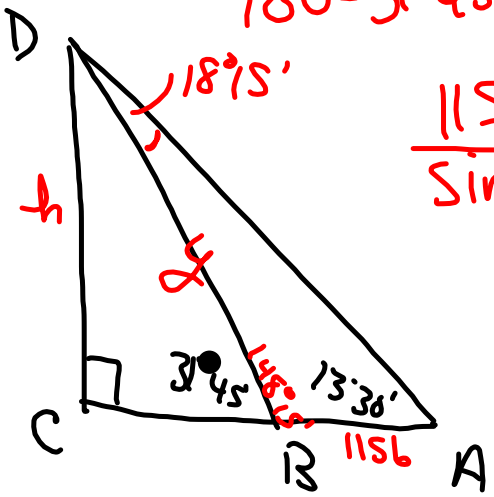
$$AC = 43.3$$

AC = 43 ft

Problem #3

A Lighthouse DC is sighted from two points, A and B, directly west of the lighthouse and on the same horizontal plane with its base C. At point A, the angle of elevation of D, the top of the lighthouse, is 13°30′ and at point B the angle is 31°45′. If AB is 1156 feet, find the height of the lighthouse to the nearest foot.

$180° - 31°45' = 148°15'$



$$\frac{1156}{\sin 18°15'} = \frac{y}{\sin 13°30'}$$

finish Fri.

HW 9.2

Test on Law of Sines Next Wednesday!