Find all the missing parts of the triangle.

2) $m\angle A = 47°, c = 23 \text{ ft}, a = 17 \text{ ft}$

$m\angle B = 51.3°, m\angle C = 81.7°, b = 18.1 \text{ ft}$

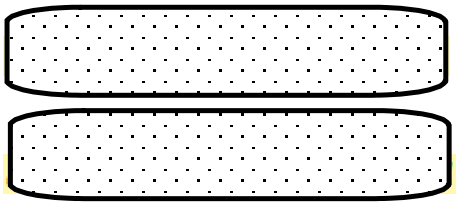
$Or \ m\angle B = 34.7°, m\angle C = 98.3°, b = 13.2 \text{ ft}$

6.2 Law of Cosines

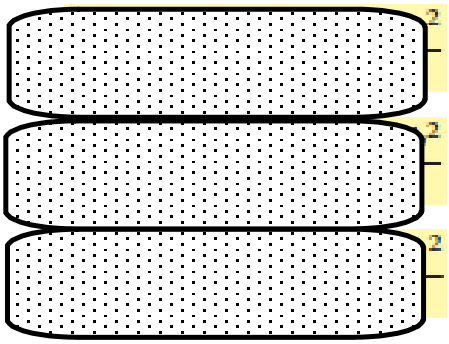
Law of Cosines (See the proof on page 465.)

Standard Form

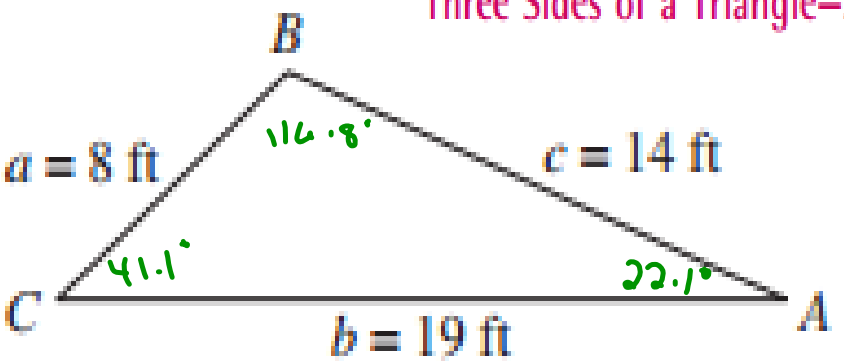
$a^2 = b^2 + c^2 - 2bc \cos A$



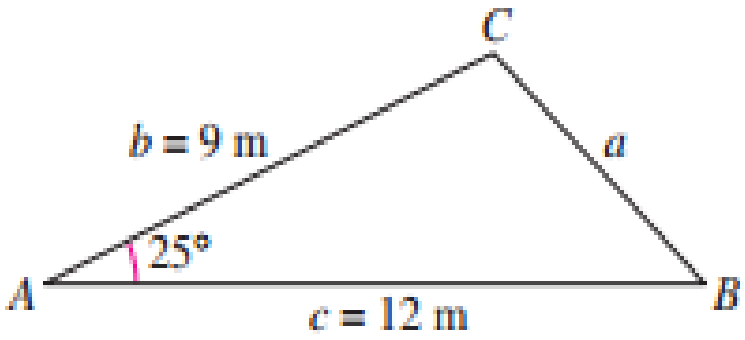
Alternative Form



Three Sides of a Triangle–SSS



$\cos A = \frac{19^2 + 14^2 - 8^2}{2(19)(14)}$ $\cos B = \frac{8^2 + 14^2 - 19^2}{2(8)(14)}$



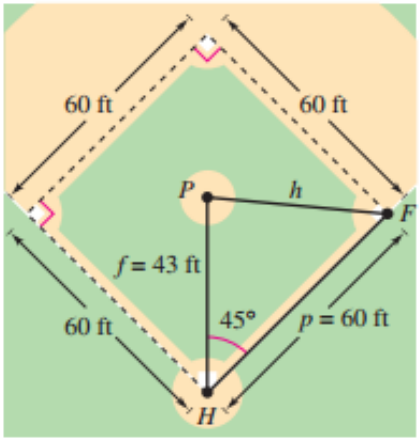
$a^2 = b^2 + c^2 - 2bc\cos A$

$a^2 = (9^2 + 12^2) - 2(9)(12)\cos 25)$

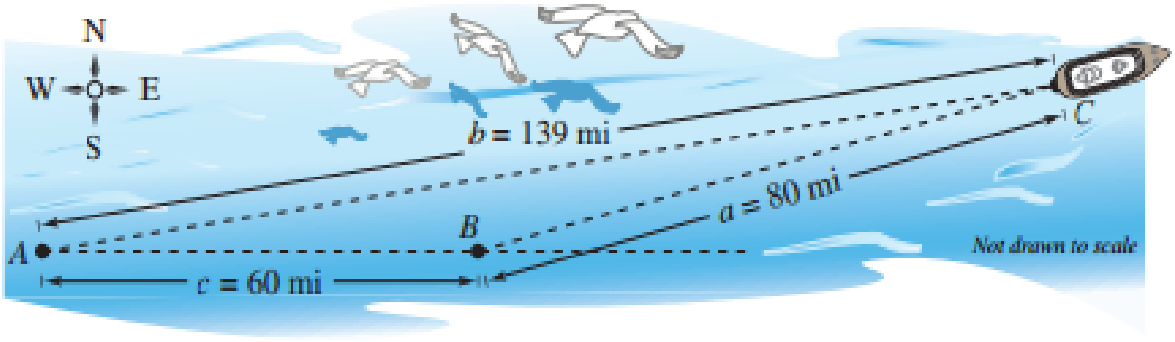
$\sqrt{a^2} = \sqrt{29.24}$

$a = 5.41 m$

The pitcher's mound on a women's softball field is 43 feet from home plate and the distance between the bases is 60 feet, as shown in Figure 6.14. (The pitcher's mound is *not* halfway between home plate and second base.) How far is the pitcher's mound from first base?



A ship travels 60 miles east, then adjusts its course northward, as shown. After traveling 80 miles in the new direction, the ship is 139 miles from its point of departure. Find angle B.

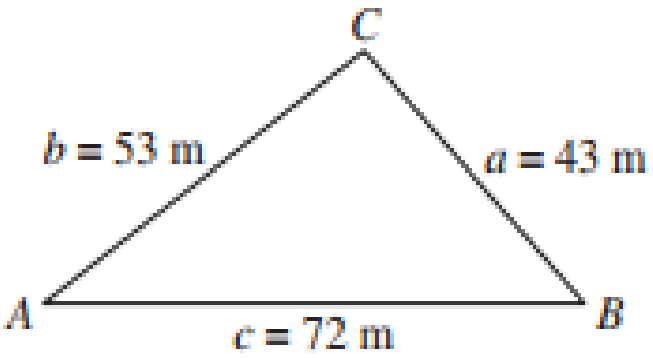


Heron's Area Formula (See the proof on page 466.)

Given any triangle with sides of lengths a, b, and c, the area of the triangle is given by

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$$

where $s = \dfrac{a+b+c}{2}$.



$s = \frac{53+43+72}{2} = \frac{168}{2} = 84$

$A = \sqrt{84(84-53)(84-43)(84-72)}$

$A = 1131.89\ m^2$

Formulas for Area of a Triangle

1. Standard Formula: $\text{Area} = \frac{1}{2}bh$
2. Oblique Triangle: $\text{Area} = \frac{1}{2}bc \sin A = \frac{1}{2}ab \sin C = \frac{1}{2}ac \sin B$
3. Heron's Area Formula: $\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$

Solve the triangle: a = 13, b = 18, c = 20

Find the area

Solve the triangle: $B = 62^\circ$, $a = 26$, $c = 19$

Find the area of a triangle having sides of length a = 14cm, b = 21cm, c = 27cm