Bellwork

The outer edges of a triangular parking lot measure 24 feet, 18 feet and 20 feet. What is the total area of the parking lot?

\[ S = \frac{(24 + 18 + 20)}{2} \quad S = 31 \]

\[ A = \sqrt{31(31-24)(31-18)(31-20)} \]

\[ A = \sqrt{31 \times 7 \times 13 \times 11} \]

\[ A = 176.2 \text{ ft}^2 \]
Law of Sines

\[
\begin{align*}
\frac{\sin 86}{25} &= \frac{\sin 21}{c} \\
25 \times \frac{\sin 86}{\sin 21} &= c \\
c &= 8.98 \\
\end{align*}
\]

\[
\begin{align*}
\frac{b \sin 86}{\sin 73} &= \frac{25 \sin 73}{\sin 86} \\
b &= 23.96 \\
b &\approx 24
\end{align*}
\]
Homework Answers

Wksht 3  #1. 42.3km²    #2 59.9 yrds²
     #3 95.5km²    4. 38.9yd²

Wksht 2  #1. A = 21.2⁰, B = 100.8⁰, c = 25.9km
Number 11:

3. Find $x$.

$16 + 9 = c^2$

Here it is $x = 5$.
Example 1: A submarine sights a moving target at a distance of 820 m. A torpedo is fired 9° ahead of the target as shown in the diagram and travels 924 m in a straight line to hit the target. How far has the target moved from the time the torpedo is fired to the time of the hit? Round to the nearest tenth of a meter.

\[ \cos 9° = \frac{820^2 + 924^2 - a^2}{2(820)(924)} \]

\[ 149670.34 = 1526176 - a^2 \]

\[ -1526176 = -29472.6 \]

\[ a = 171.7 \text{ m} \]
Example 2

Given: A pole tilts toward the sun at an $8^\circ$ angle from the vertical, and it casts a 22 foot shadow. The angle of elevation from the tip of the shadow to the top of the pole is $43^\circ$.

Find: How tall is the pole?

\[
\frac{\sin 39^\circ}{22} = \frac{\sin 43^\circ}{b}
\]

\[
b \cdot \sin 39^\circ = 22 \cdot \sin 43^\circ
\]

\[
b = \frac{22 \cdot \sin 43^\circ}{\sin 39^\circ} 
\]

\[
b = 23.8'
\]
Example 3: A boat leaves a dock and travels 45° northwest averaging 30 knots for 2 hours. The boat then turns west creating an angle of 135° and travels directly west averaging 40 knots for 3 hours.

a. How many nautical miles is the boat from the dock after these 5 hours?

\[ \cos 135 = \frac{120^2 + 168^2 - a^2}{2 \times 120 \times 168} \]
\[ 1 - 0.18234 = 18000 - a^2 \]
\[ a = 168 \text{ Knots} \]

b. How many degrees southeast is the dock from the boat’s present position?

\[ \cos B = \frac{120^2 + 168^2 - 60^2}{2 \times 120 \times 168} \]
\[ \cos B = 0.9679 \]
\[ \cos^{-1}(0.9679) = B \]
\[ B = 13.60° \]
Summary...

• How will you know which formula to use to solve a certain problem?

Practice:

Worksheet 4  #2, 3, 4, 5, 6
Worksheet 3 Area of triangles #5, 6, 7, 8
Worksheet 1 Law of Sines
  finish 1-8, 10, 11, 13, 15
Worksheet 2 Law of Cosines  finish 1-6
Homework Answers

Worksheet 4

#2. 124.1 ft.²
#3. 4.1 miles
#4. 599.2 ft.
#5. a = 188 miles   b. <S = 23.5°   c. <C = 46.5°
#6. 312 feet of fence.
Bellwork

A ship at sea is 92 miles from one radio tower and 124 miles from another. The angle between the radio signals has a measure of $156^\circ$. Find the distance between the radio towers.