## 11-3 Solving Triangles

## Objectives:

I can solve triangles for lengths and sides using inverse trig functions, Pythagorean theorem the sum of the angles, and the law of sines. $11-2$

## To "solve" a triangle means to find ALL side lengths and angle measures.

## REMEMBER

-All triangles have an angle sum of 180 degrees-2 ang(e)
-Pythagorean Theorem to find a missing side when you know two (right triangles only)
-Law of sines is used for non-right triangles for given ASA or AAS

Solve each right triangle. Round lengths to the nearest tenth and angles to the nearest degree.


$$
\begin{array}{ll}
\angle P=93^{\circ} & p=17.57 \\
\measuredangle Q=90^{\circ} & q=22 \\
\measuredangle R=37^{\circ} & r=13.24 \\
\angle P=180-98-37
\end{array}
$$

FOR $P$ :

$$
22 \cdot \sin 37=\frac{r}{22}
$$

$22 \cdot \cos 37=\frac{P}{22}$

$$
\begin{aligned}
17.57 & =p \\
r^{2}+17.57^{2} & =22^{2} \\
-17.57^{2} & =-17.57^{2} \\
r^{2} & =\sqrt{174} \\
r & =13.24
\end{aligned}
$$

Your Turn!
Solve each right triangle. Round lengths to the nearest tenth and angles to the nearest degree.



 For $r:$
47 (cos $52=\frac{r}{4}$
$r=28.94$

$\sqrt{47^{2}-28.94^{2}}=$


A building casts a $33-\mathrm{m}$ shadow when the Sun is at an angle of $27^{\circ}$ to the vertical. How tall is the building, to the nearest meter? How far is it from the top of the building to the tip of the shadow? What angle does a ray from the fun along the edge of the shadow make with the ground?

Find all missing lengths and sides


$$
\begin{aligned}
& \frac{a}{\sin A}=\frac{b}{\sin B}=\frac{c}{\sin C} \\
& \frac{a}{\sin 36} x<\frac{15}{\sin 96} \quad \frac{15}{\sin 96}=\frac{c}{\sin 48} \\
& \frac{15 \cdot \sin (36)=a \cdot \frac{\sin 96}{\sin 96}}{\frac{15 \cdot \sin 48)}{\sin 96}} \cdot \frac{\sin 96}{\sin 96} \\
& a=8.87 \quad 11.21=c
\end{aligned}
$$

Find all missing lengths and sides


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