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, regular trig functions

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

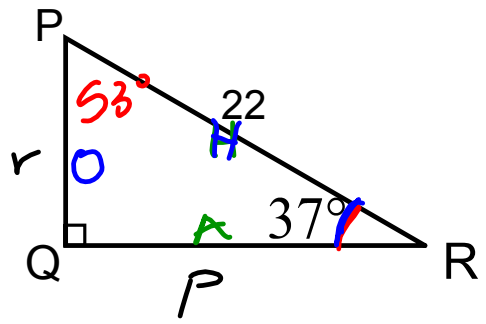
REMEMBER

- All triangles have an angle sum of 180 degrees (know 2 angles)
- Pythagorean Theorem to find a missing side when you know two (right triangles only) (know 2 sides) $a^2+b^2=c^2$
- Inverse Trig to find a missing angle (right triangles only) (know 1 angle)
- Regular Trig to find missing sides (right triangles) (know 1 side)
  - Law of sines is used for non-right triangles for given ASA or AAS

= find angles

= find sides

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



$\measuredangle P =$ 53° $p =$ 17.6

$\measuredangle Q =$ 90° $q =$ 22

$\measuredangle R =$ 37° $r =$ 13.2

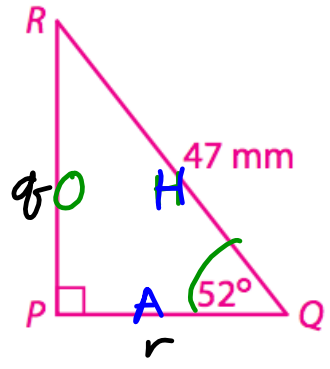
$22 \cdot \cos(37°) = \frac{p}{22} \cdot 22$

$p = 17.6$

$22 \cdot \sin(37°) = \frac{r}{22} \cdot 22$

Your Turn!

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



$\angle P =$ 90° $p =$ 47mm

$\angle Q =$ 52° $q =$ 37.0 mm

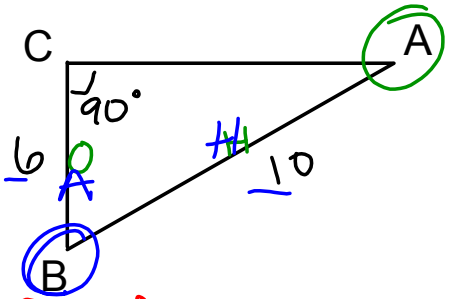
$\angle R =$ 38° $r =$ 28.9 mm

$47 \cdot \sin(52) = \frac{q}{47} \cdot 47$

$47 \cdot \cos(52) = \frac{r}{47} \cdot 47$

A building casts a 33-m shadow when the Sun is at an angle of 27° 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 Sun along the edge of the shadow make with the ground?

Solve the triangle given a=6, c=10 and C=90 degrees.



$\angle A = 37°$

$\angle B = 53°$

$\angle C = 90°$

$a = 6$

$b = 8$

$c = 10$

$a^2 + b^2 = c^2$

$6^2 + b^2 = 10^2$

$36 + b^2 = 100$

$-36 \quad -36$

$b^2 = 64$

$b = 8$

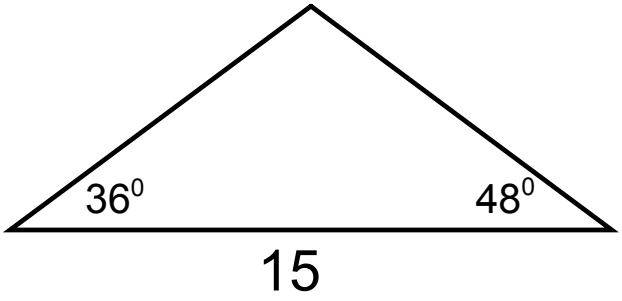
$\sin(A) = \frac{6}{10}$

$\sin^{-1}\left(\frac{6}{10}\right) = A$

$\cos(B) = \frac{6}{10}$

$\cos^{-1}\left(\frac{6}{10}\right) = B$

Find all missing lengths and sides



Find all missing lengths and sides