6-1 Solving Right Triangles

Objectives:

6-1a: I can write all six trigonometric ratios from a right triangle.

6-1b: I can solve right triangles using trigonometric functions.

Feb 23-9:10 AM

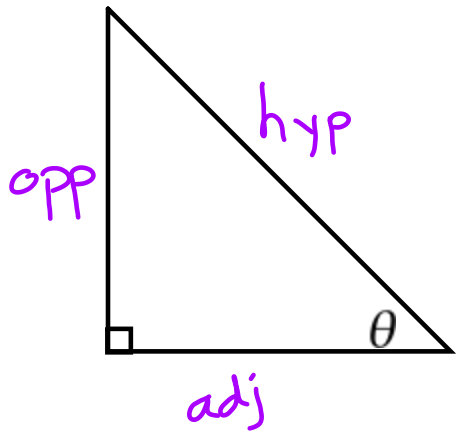
cosecant (csc)
secant (sec)
cotangent (cot)

$\sin\theta = \frac{opp}{hyp}$ $\csc\theta = \frac{hyp}{opp}$

$\cos\theta = \frac{adj}{hyp}$ $\sec\theta = \frac{hyp}{adj}$

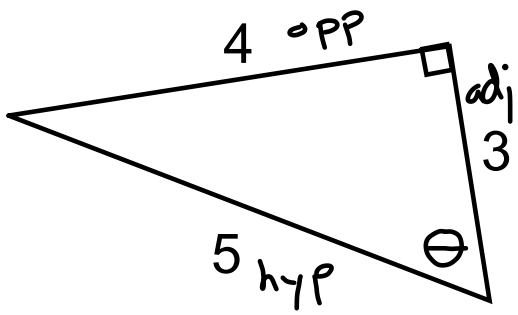
$\tan\theta = \frac{opp}{adj}$ $\cot\theta = \frac{adj}{opp}$

SohCahToa



Dec 15-10:47 AM

Write all six trig functions for the given right triangle.



$\sin\theta = \frac{4}{5}$ $\csc\theta = \frac{5}{4}$

$\cos\theta = \frac{3}{5}$ $\sec\theta = \frac{5}{3}$

$\tan\theta = \frac{4}{3}$ $\cot\theta = \frac{3}{4}$

Dec 15-10:48 AM

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

REMEMBER

-All triangles have an angle sum of 180 degrees

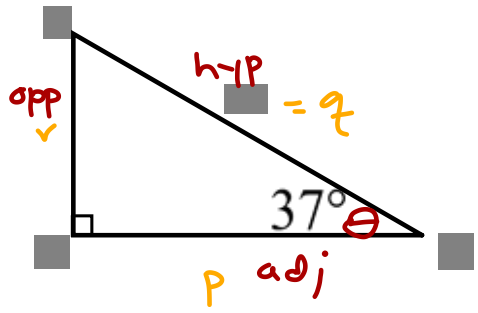
-Pythagorean Theorem to find a missing side when you know other two sides (right triangles only) $leg^2 + leg^2 = hyp^2$

-Inverse Trig to find a missing angle (right triangles only)

Feb 23-9:39 AM

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

$180° - 90° - 37° = 53°$



$\angle P = 53°$ $p = 17.6$

$\angle Q = 90°$ $q = 22$

$\angle R = 37°$ $r = 13.2$

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

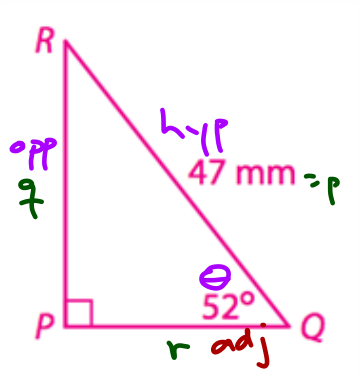
$r = 22 \cdot \sin 37° = 13.2$

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

$p = 22 \cdot \cos 37° = 17.6$

Oct 20-5:02 PM

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



$\angle P = 90°$ $p = 47$

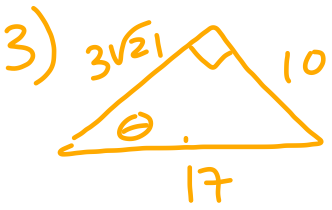
$\angle Q = 52°$ $q = 37$

$\angle R = 38°$ $r = 29$

$47 \sin 52° = \frac{q}{47} \cdot 47$

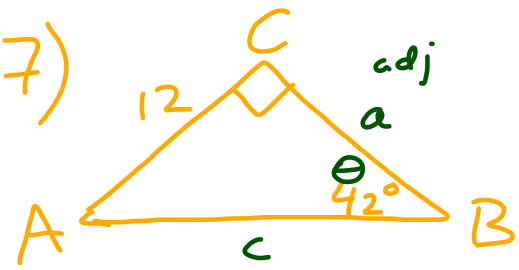
$47 \cos 52° = \frac{r}{47} \cdot 47$

Feb 23-9:45 AM

3) 

$\sin\theta = \frac{10}{17}$

$\cos\theta = \frac{3\sqrt{21}}{17}$

7) 

$A = 48^\circ$ $a = 13.3$

$B = 42^\circ$ $b = 12$

$C = 90^\circ$ $c = 18$

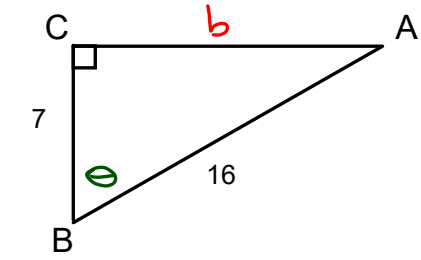
$a \cdot \tan 42^\circ = \frac{12}{a} \cdot a$

$\frac{a \cdot \tan 42^\circ}{\tan 42^\circ} = \frac{12}{\tan 42^\circ}$

$c \cdot \sin 42^\circ = \frac{12}{c} \cdot c$

$\frac{c \cdot \sin 42^\circ}{\sin 42^\circ} = \frac{12}{\sin 42^\circ}$

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



$90° - 64.1° =$

$A = 25.9°$ $a = 7$

$B = 64.1°$ $b = 14.4$

$C = 90°$ $c = 16$

$\cos\theta = \frac{7}{16}$

$\theta = 64.1°$

$16 \cdot \sin 64.1° = \frac{b}{16} \cdot 16$

$b = 14.4$

or

$7^2 + b^2 = 16^2$

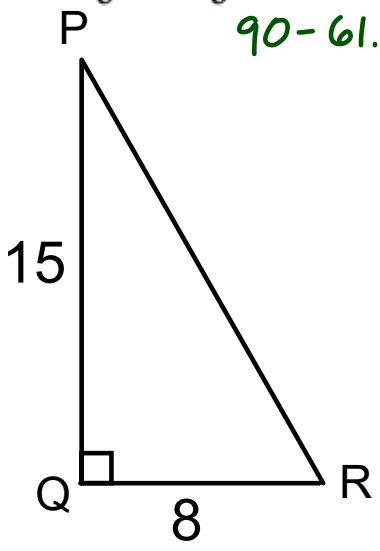
$b^2 = 16^2 - 7^2$

$b^2 = 207$

$b = 14.4$

Apr 26-7:36 AM

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



$90 - 61.9° = 29.1°$

$\angle P = 29.1°$ $p = 8$

$\angle Q = 90°$ $q = 12.7$

$\angle R = 61.9°$ $r = 15$

$\tan^{-1} \tan R = \frac{15}{8}$

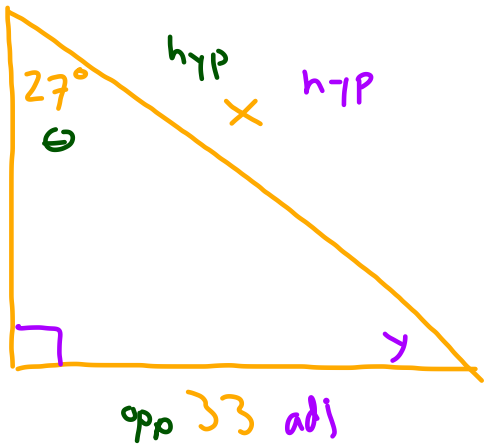
$R = 61.9°$

$p^2 + q^2 = r^2$

$8^2 + q^2 = 15^2$

$q^2 = 161$

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?



$\sin 27° = \frac{33}{x}$

$x = \frac{33}{\sin 27°} = 72.7\text{ m}$

$\cos y = \frac{33}{72.7}$

$y = 63°$

Feb 23-9:54 AM