Chapter 9 Trigonometry

Vocab

Trigonometry -

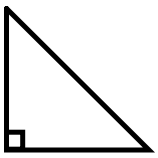
The study of three sided figures and the relationships between their sides and angles. The word and majority of the it's principles were taken from the Greeks.

Hypotenuse -

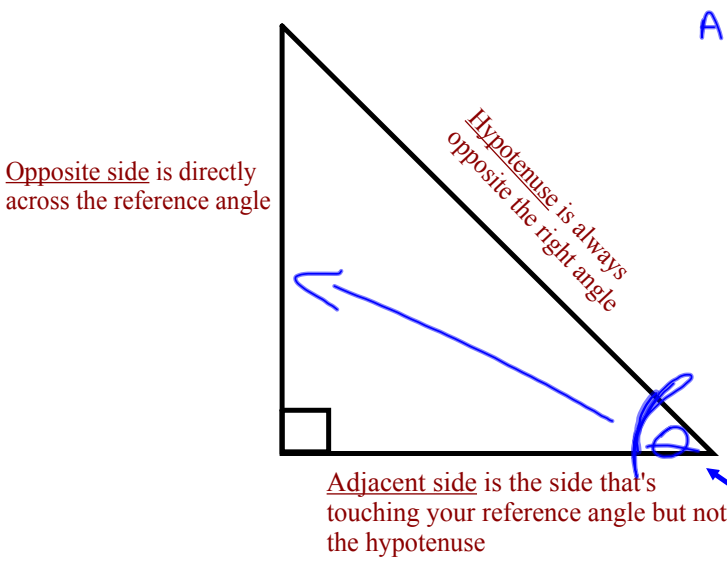
The longest side of a right triangle that is located directly opposite of the right angle.

Legs -

The two perpendicular sides of a right triangle are called it's legs.



Right Triangle Trigonometry ratios



$$\sin\theta = \frac{O}{H}$$

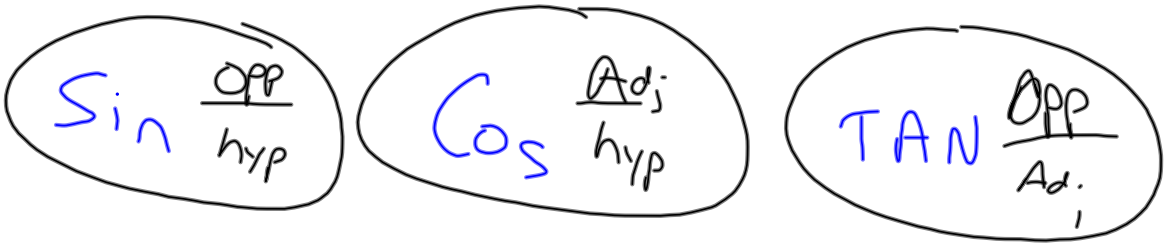
$$\cos\theta = \frac{A}{H}$$

$$\tan\theta = \frac{O}{A}$$

The reference angle is either the angle that's given to you or the angle your trying to find. It's not the right angle.

Note: The Opposite and Adjacent sides are considered the legs of the right triangle.

The acronym SOH-CAH-TOA can be used to help you remember the right triangle trig ratios.



OSCAR HAD A HEAP of APPLES

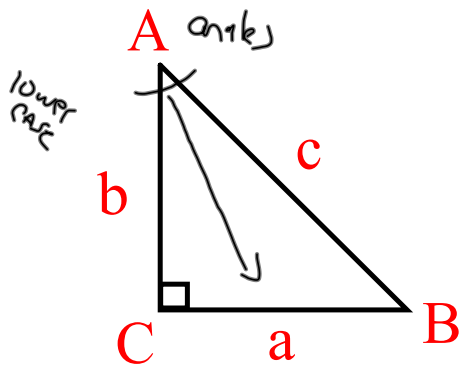
When Do We Use The Right Triangle Trig Ratios?

$$\sin\theta = \frac{O}{H}$$

$$\cos\theta = \frac{A}{H}$$

$$\tan\theta = \frac{O}{A}$$

- If you have the lengths of 2 sides of a right triangle given to you and you are asked to find an angle
- If you have the length of 1 side and another angle, you can find any other side or angle.

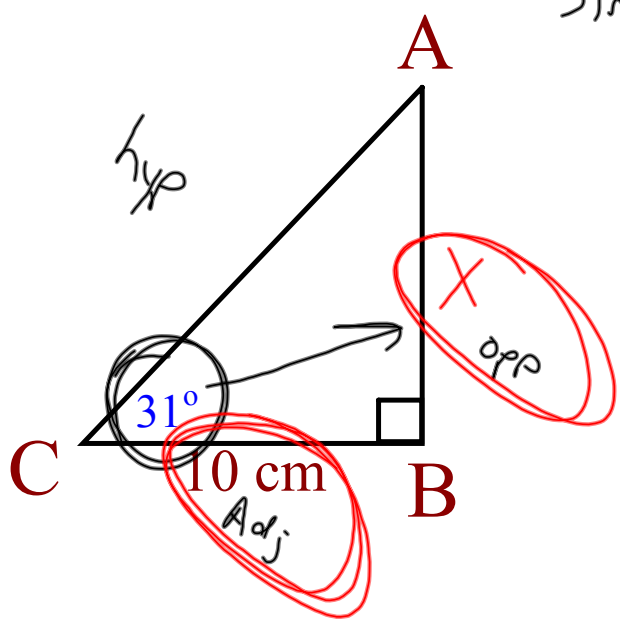


Notation for triangles: Capital Letters represent angles and lowercase letters represent the side opposite that angle. Sides may also be notes by using their endpoints in capital letters.

Ex: side $\overline{BC}$ is also known as side a because it's opposite of angle A.

1) Find side c to the nearest integer.

Sin $\frac{O}{H}$ Cos $\frac{A}{H}$ TAN $\frac{O}{A}$



$\tan\theta = \frac{O}{A}$

$\frac{\tan 31}{1} = \frac{X}{10}$

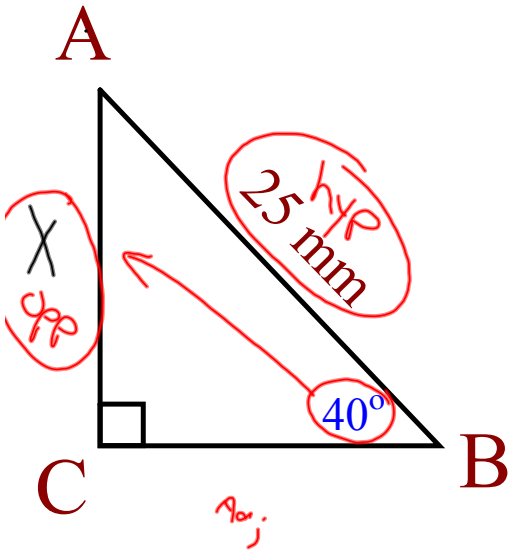
$X = (\tan 31)(10)$

$X =$ tan(31)(10) 6.00860619

$X = 6$

2) Find side AC to the nearest tenth.

SIN O/H COS A/H TAN O/A



$\frac{\sin 40}{1} = \frac{O}{H}$

$\frac{\sin 40}{1} = \frac{X}{25}$

$X = (25)(\sin 40)$

$X =$

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sin(40)(25)
     16.06969024
■
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25sin(40)
     16.06969024
■
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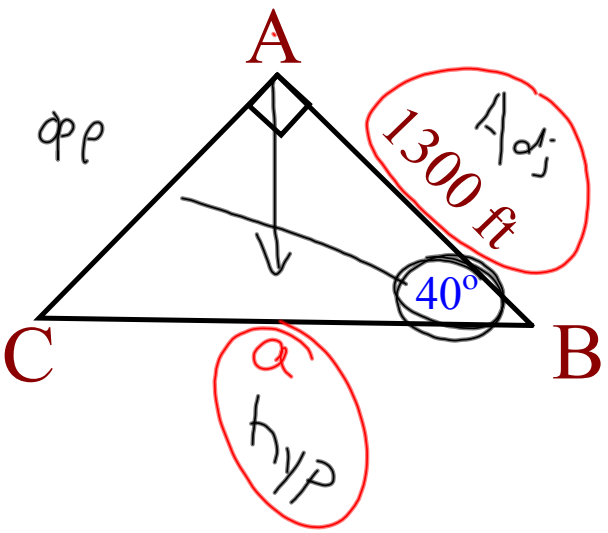
$X = 16.1$

3) Find side a to the nearest hundredth.

Sin $\frac{O}{h}$ Cos $\frac{A}{h}$ TAN $\frac{O}{A}$



$$\frac{\cos 40}{1} = \frac{A}{h}$$

$$\frac{\cos 40}{1} = \frac{1300}{a}$$

$$\frac{(a)(\cos 40)}{\cos 40} = \frac{1300}{\cos 40}$$

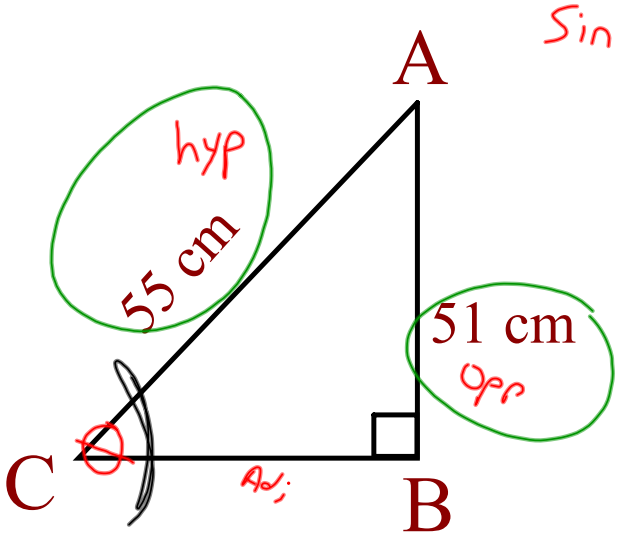
$$a = \frac{1300}{\cos 40}$$

$a =$ 1300/cos(40) 1697.029476

$a = 1697.03$

4) Find $\angle C$ to the nearest degree.

SIN $\frac{O}{h}$ COS $\frac{A}{h}$ TAN $\frac{O}{A}$



$\sin\theta = \frac{O}{h}$

$\sin\theta = \frac{51}{55}$

θ sin⁻¹(51/55) 68.013597

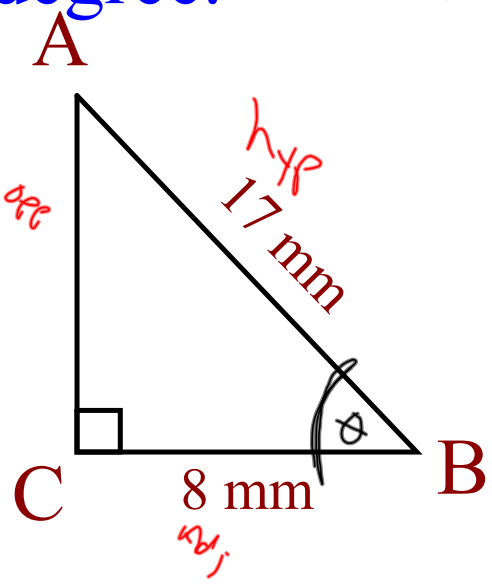
$\theta = 68°$

$\sin^{-1}$

$\frac{\sin}{1} \cdot \frac{1}{\sin}$

5) Find $\measuredangle B$ to the nearest tenth of a degree.

SIN $\frac{O}{h}$ COS $\frac{A}{h}$ TAN $\frac{O}{A}$



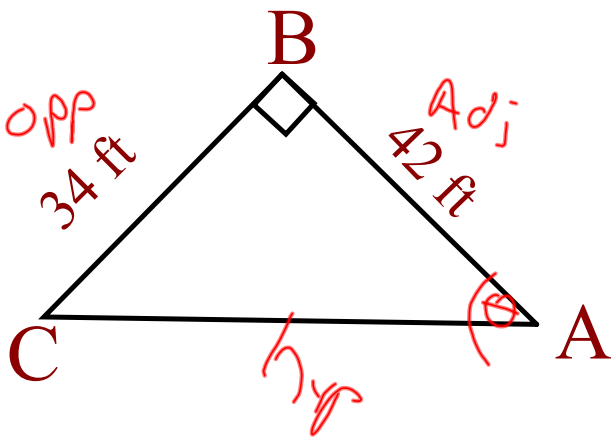
$\cos\theta = \frac{8}{17}$

$\theta = \approx$ cos⁻¹(8/17) 61.92751306

≈ 61.9

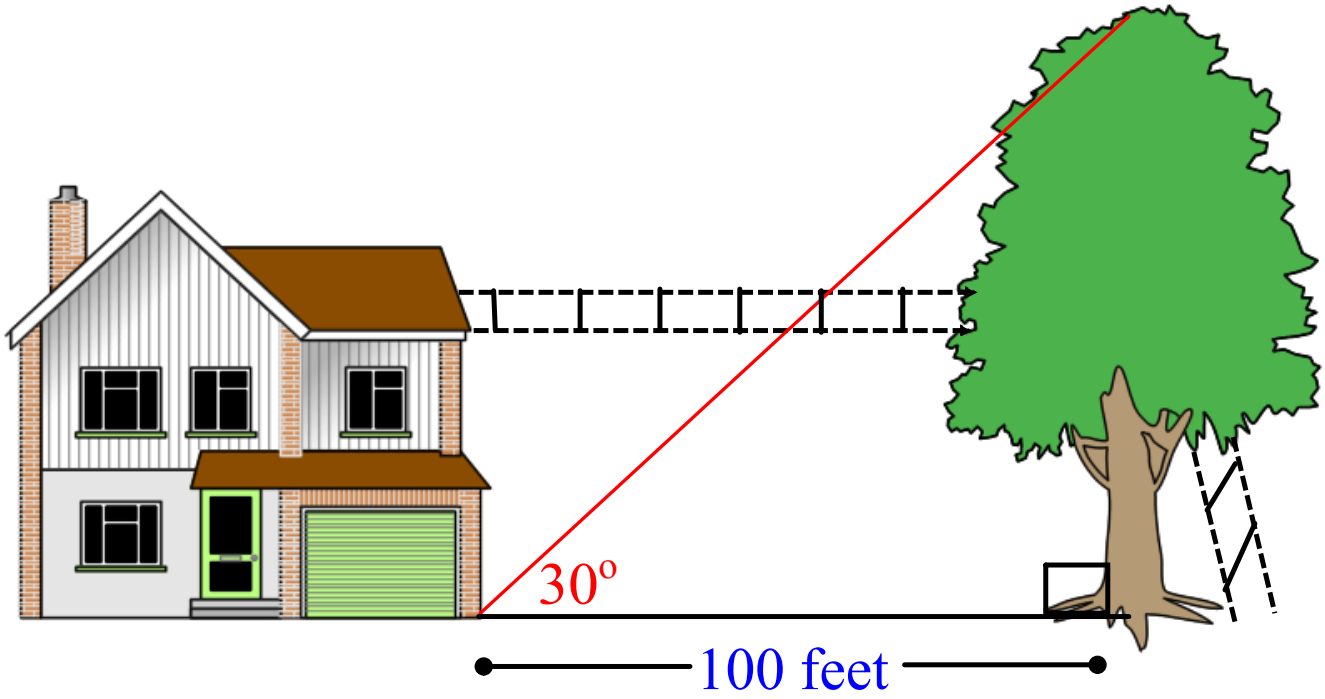
6) Find $\measuredangle A$ to the nearest hundredth of a degree.

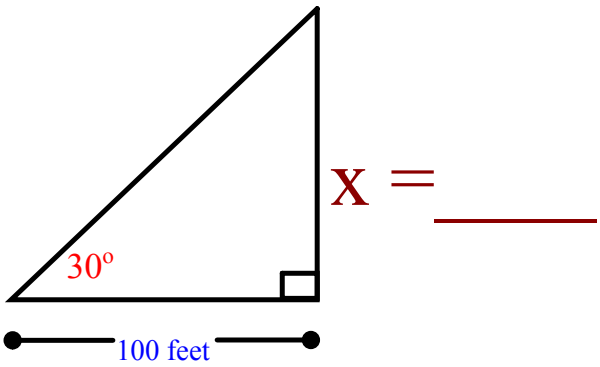
$\tan\theta = \frac{34}{42}$



$\theta =$ tan⁻¹(34/42) = 38.99099404

You can use trig to solve a problem like this. A tree is growing 100 feet away from a house in it's fenced back-yard. The angle of elevation from the base of the house to the top of the tree is 30°. Will the tree hit the house if cut down at the ground?





x = _____

Homework is on page 312-313
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