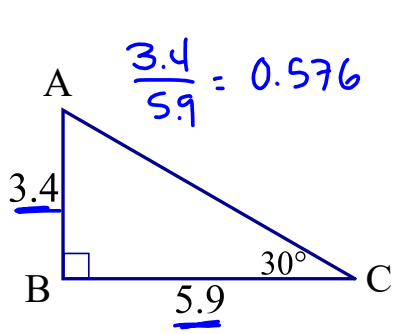
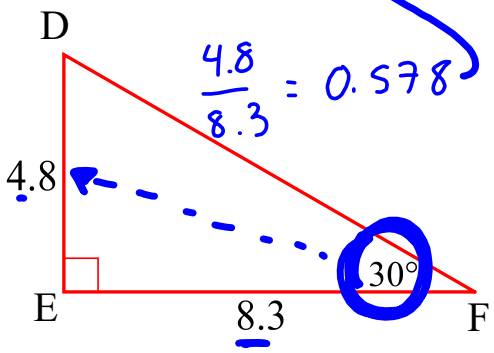
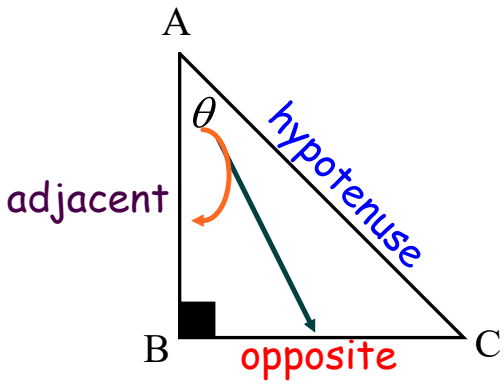
Trigonometry

Part 1: Applies Only to Right Triangles





$\triangle ABC \sim \triangle DEF$,which means their corresponding sides are proportional. We know that any ratios created with corresponding sides from two similar right triangles will always be equal.



There are three main trigonometric ratios; they are:

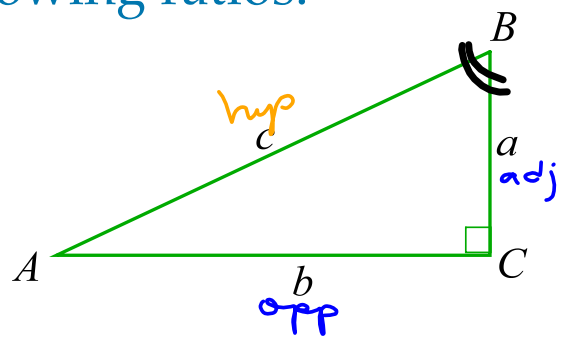
$$\text{Sine}\,\theta = \frac{opposite}{hypotenuse}$$

$$\text{Cosine}\,\theta = \frac{adjacent}{hypotenuse}$$

SOH CAH TOA

$$\text{Tangent}\,\theta = \frac{opposite}{adjacent}$$

For $\triangle ABC$, determine the following ratios.



$\sin A = \frac{opp}{hyp} = \frac{a}{c}$ $\cos B = \frac{a}{c}$

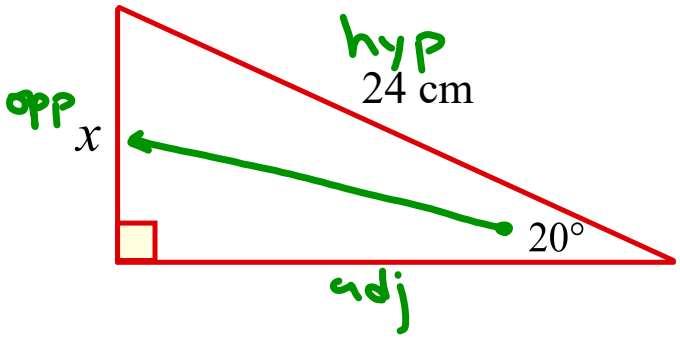
$\tan B = \frac{b}{a}$ $\sin B = \frac{b}{c}$

$\cos A = \frac{adj}{hyp} = \frac{b}{c}$ $\tan A = \frac{opp}{adj} = \frac{a}{b}$

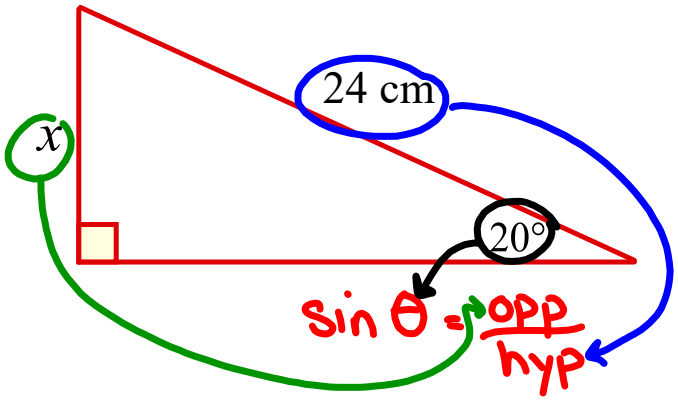
Trigonometry

Finding Missing Sides (given a side and an angle)

Example:



- With respect to the angle, determine which side you're given and which side you want.
- Determine which trig ratio uses these sides.
- Fill in the ratio with the given information, then calculate the length of the missing side.



Given side: hyp

Wanted side: opp

Trig ratio: sine

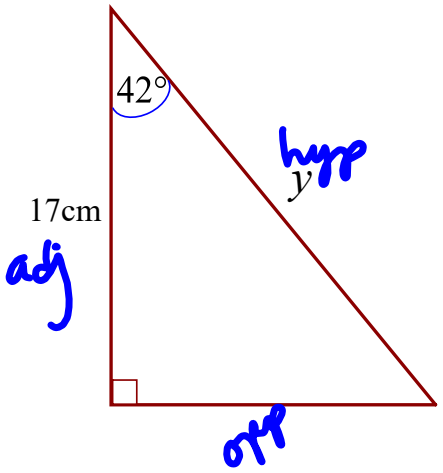
$$24 \cdot \sin 20° = \frac{x}{24} \cdot 24$$

$$24 \cdot \sin 20° = x$$

$$8.21 = x$$

$x = 8.21\ cm$

Example:



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

Given side: adj

Wanted side: hyp

Trig ratio: cosine

$$\cos 42° = \frac{17}{y}$$ switch

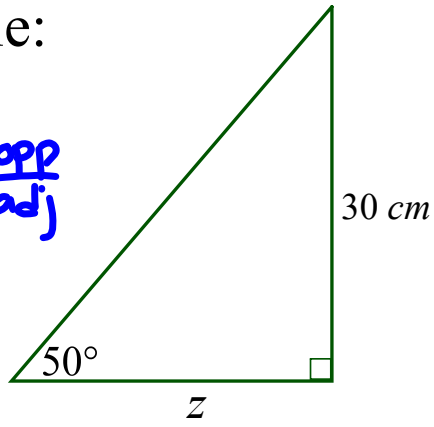
$$y\cos 42° = 17$$

$$y = \frac{17}{\cos 42°}$$

$$y = 22.88cm$$

Example:

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



Given side: opp

Wanted side: adj

Trig ratio: tangent

$$\tan 50° = \frac{30}{z}$$ switch

$$z = \frac{30}{\tan 50°}$$

$$z = 25.17cm$$

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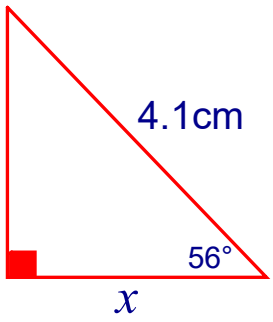

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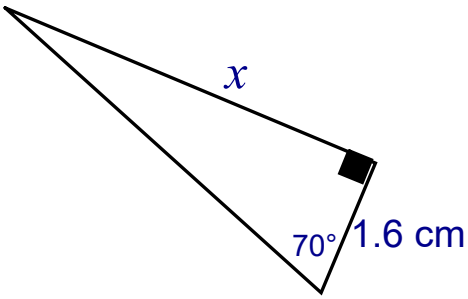

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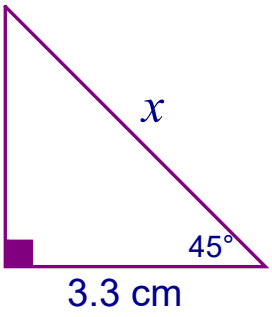

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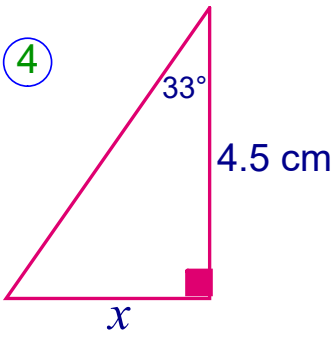

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