

SOLVING RIGHT TRIANGLES



LEARNING GOALS

- Use the primary trigonometric ratios to calculate side lengths and angle measures in right triangles.



MINDS ON ...

- Trigonometric Puzzle



THINK BACK!

- Name some opposite mathematical operations.
 - Addition and subtraction
 - Multiplication and division
 - Squaring and square rooting
 - Factoring and expanding
- These are opposite operations because they “undo” each other.
- What would the opposite operation to sine, cosine, and tangent be?



BIG IDEAS

- When you know the lengths of two sides in a right triangle, you can use the appropriate trigonometric ratio to determine an angle by finding its inverse.
- These functions are on your calculator above the sine, cosine, and tangent buttons. They are given as \sin^{-1} , \cos^{-1} , and \tan^{-1} .



EXAMPLES

$$\sin x = 0.8829$$
$$\angle x = \sin^{-1}(0.8829)$$

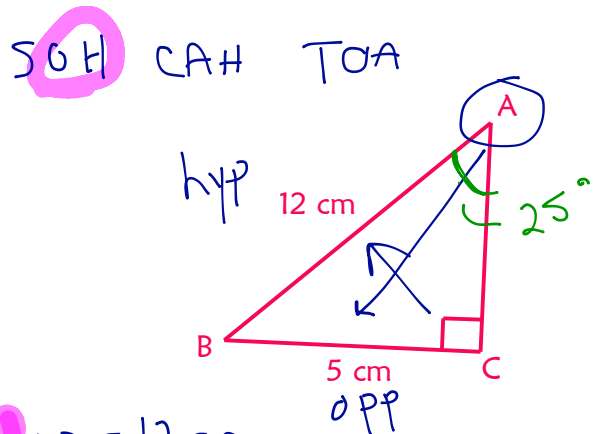
1. Calculate x following to the nearest degree.

- | | | |
|----|-------------------|----------------------------|
| a) | $\sin x = 0.8829$ | $x = \underline{62^\circ}$ |
| b) | $\cos x = 0.9511$ | $x = \underline{18^\circ}$ |
| c) | $\tan x = 0.4452$ | $x = \underline{24^\circ}$ |
| d) | $\sin x = 1/3$ | $x = \underline{19^\circ}$ |
| e) | $\cos x = 2/7$ | $x = \underline{73^\circ}$ |
| f) | $\tan x = 3/4$ | $x = \underline{37^\circ}$ |



MORE EXAMPLES

2. Calculate angle A to the nearest degree.



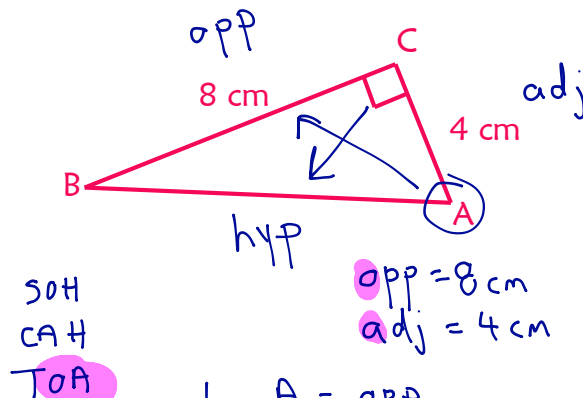
hyp = 12 cm
opp = 5 cm

$$\sin A = \frac{\text{opp}}{\text{hyp}}$$

$$\sin A = \frac{5}{12}$$

$$\angle A = \sin^{-1}\left(\frac{5}{12}\right)$$

$$\angle A = 25^\circ$$



opp = 8 cm
adj = 4 cm

$$\tan A = \frac{\text{opp}}{\text{adj}}$$

$$\tan A = \frac{8}{4}$$

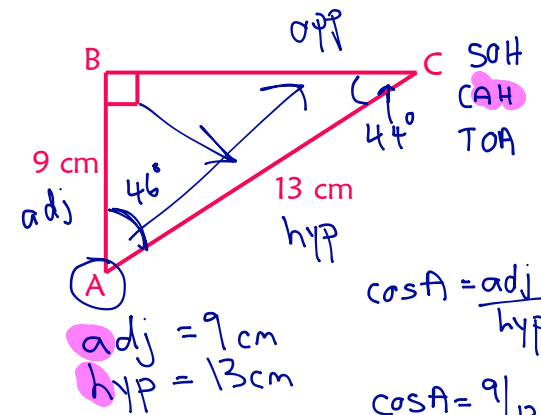
$$\tan A = 2$$

$$\angle A = \tan^{-1}(2)$$

$$\angle A = 63^\circ$$

$$\angle C = 180 - 90 - 46$$

$$\angle C = 44^\circ$$



adj = 9 cm
hyp = 13 cm

$$\cos A = \frac{\text{adj}}{\text{hyp}}$$

$$\cos A = \frac{9}{13}$$

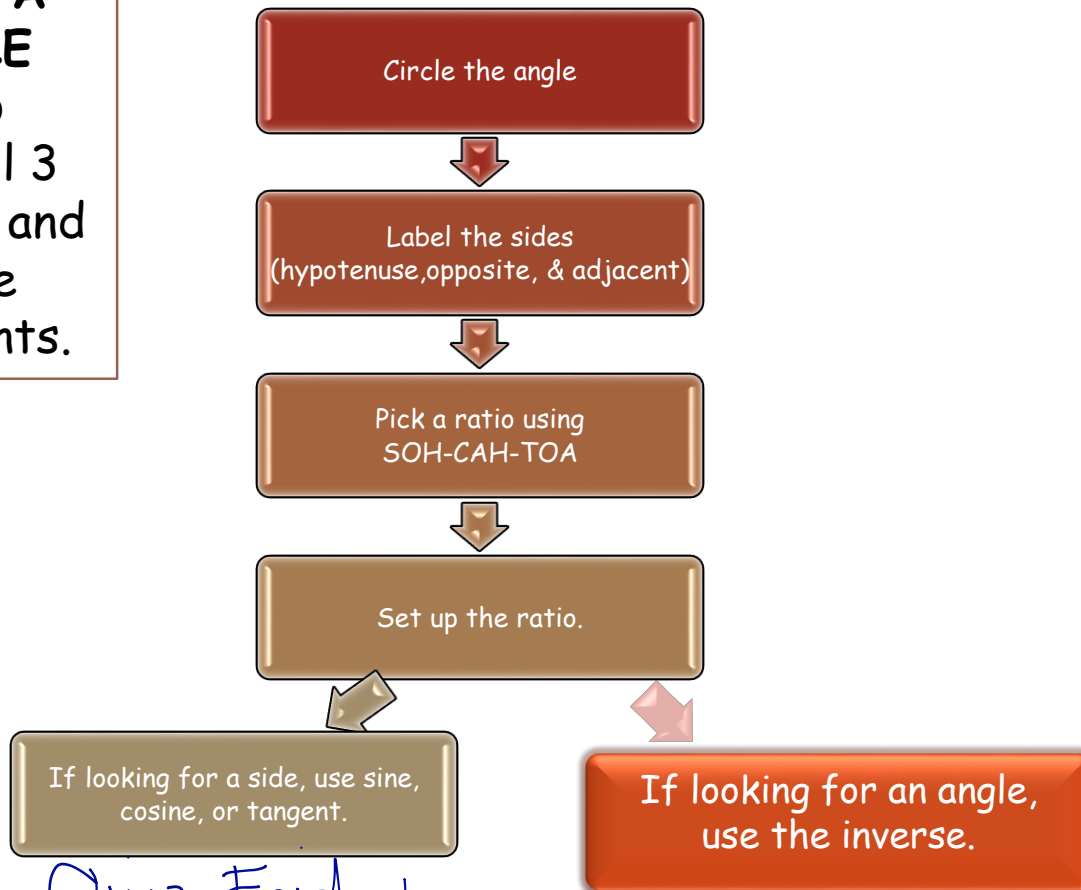
$$\angle A = \cos^{-1}\left(\frac{9}{13}\right)$$

$$\angle A = 46^\circ$$



CONSOLIDATION

SOLVING A TRIANGLE
means to
calculate all 3
side lengths and
all 3 angle
measurements.



Quiz Friday

Solving Right Triangles



REINFORCEMENT

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Quiz Friday!

