

TRIGONOMETRY

SINE, COSINE, AND TANGENT

TRIGONOMETRIC RATIOS

Sine

Opposite

Hypotenuse

Cosine

Adjacent

Hypotenuse

Tangent

Opposite

Adjacent

$$\sin A = \frac{\text{opp}}{\text{hyp}} \text{ or } \frac{a}{c}$$

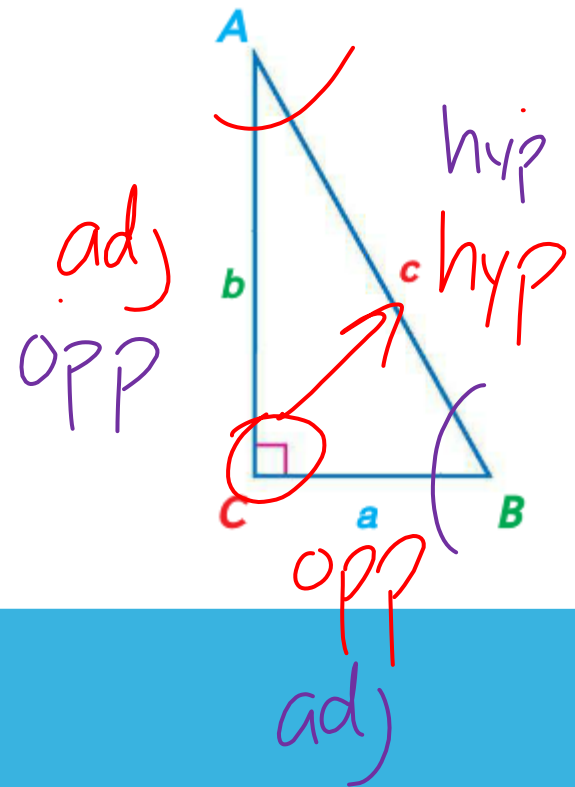
$$\sin B = \frac{\text{opp}}{\text{hyp}} \text{ or } \frac{b}{c}$$

$$\cos A = \frac{\text{adj}}{\text{hyp}} \text{ or } \frac{b}{c}$$

$$\cos B = \frac{\text{adj}}{\text{hyp}} \text{ or } \frac{a}{c}$$

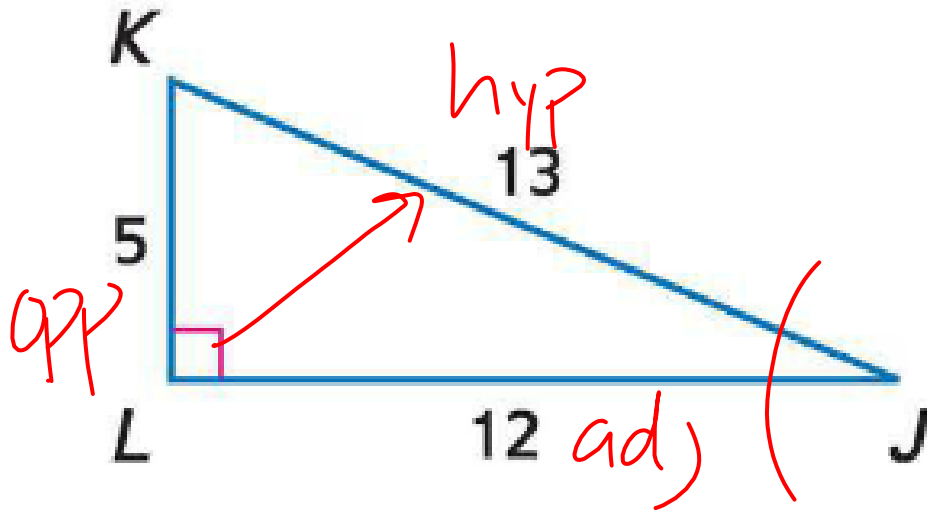
$$\tan A = \frac{\text{opp}}{\text{adj}} \text{ or } \frac{a}{b}$$

$$\tan B = \frac{\text{opp}}{\text{adj}} \text{ or } \frac{b}{a}$$



EXAMPLES

Find $\sin J$, $\cos J$, $\tan J$, $\sin K$, $\cos K$, and $\tan K$. Express each ratio as a fraction and as a decimal to the nearest hundredth.



$$\sin J = \frac{5}{13} = .38$$

$$\cos J = \frac{12}{13} = .92$$

$$\tan J = \frac{5}{12} = .42$$

$$\sin K = \frac{12}{13} = .92$$

$$\cos K = \frac{5}{13} = .38$$

$$\tan K = \frac{12}{5} = 2.4$$

EXAMPLES

$$\sin J = 5/13 = .38$$

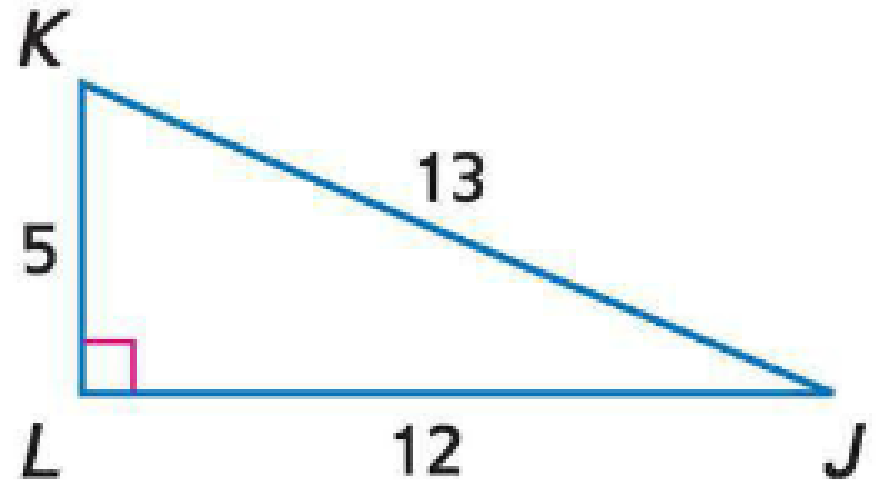
$$\cos J = 12/13 = .92$$

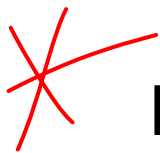
$$\tan J = 5/12 = .42$$

$$\sin K = 12/13 = .92$$

$$\cos K = 5/13 = .38$$

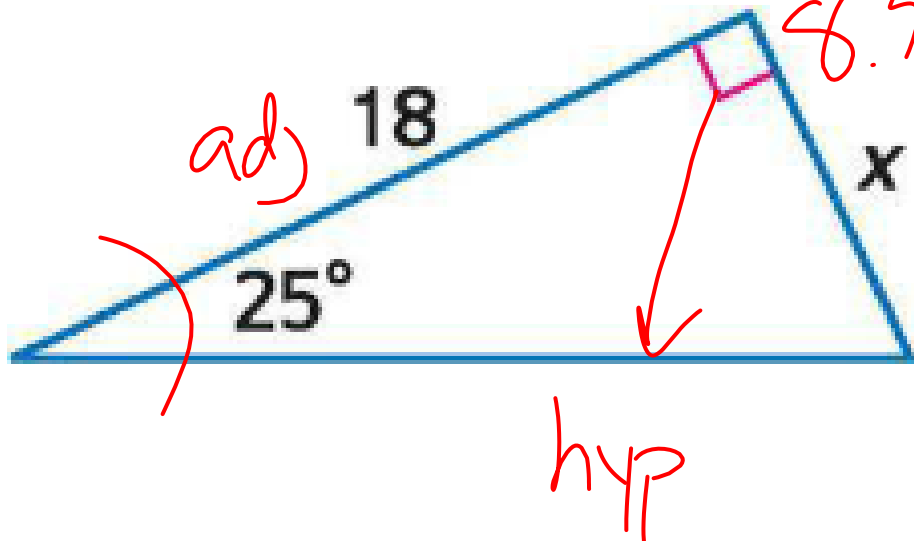
$$\tan K = 12/5 = 2.4$$





EXAMPLES

Find x to the nearest hundredth.



18. $\tan 25 = \frac{x}{18}$
↓

$18 \tan 25 = x$

$\tan 25$

$25 \tan$

RAD DEG

.466

EXAMPLES

Find x to the nearest hundredth.

$$\tan 25 = x/18$$

$$18 \cdot \tan 25 = x$$

$$x = 8.39$$



INVERSE TRIGONOMETRIC RATIOS

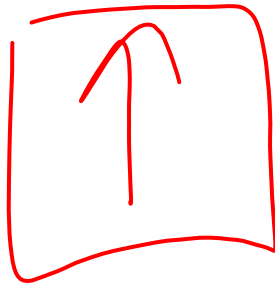
Inverse trigonometric ratios give the measure of the angle.

$$\sin^{-1} x = m\angle A$$

$$\cos^{-1} x = m\angle A$$

$$\tan^{-1} x = m\angle A$$

2nd



Inv

EXAMPLES

78.463
↑
:

Use a calculator to find the measure of $\angle A$ to the nearest tenth.

$\cos A = \frac{3}{15}$

$\cos^{-1} \frac{3}{15} = A$

$= 78.5$

opp

adj

hyp

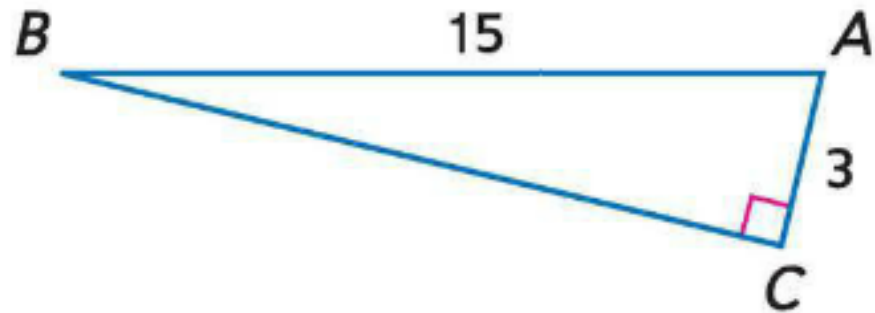
EXAMPLES

Use a calculator to find the measure of $\angle A$ to the nearest tenth.

$$\cos A = 3/15$$

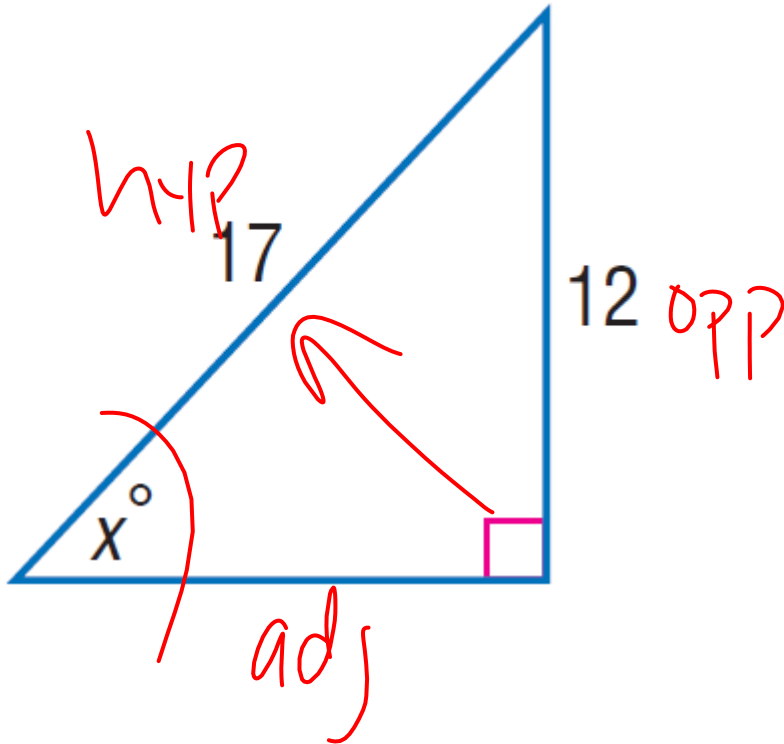
$$\cos^{-1}(3/15) = A$$

$$A = 78.5$$



EXAMPLES

Find x . Round to the nearest tenth.



$$\sin X = \frac{12}{17}$$
$$\sin^{-1} \frac{12}{17} = x$$

$$x = 45.0$$

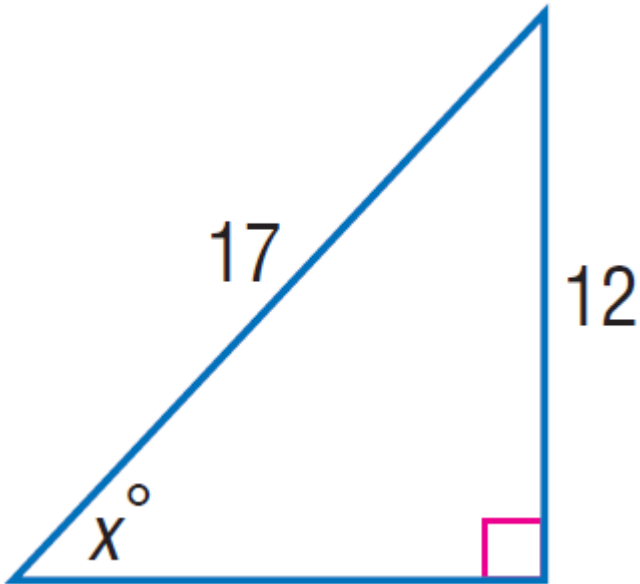
$$45.1$$

$$44.9$$

$$35.2$$

EXAMPLES

Find x . Round to the nearest tenth.



$$\sin x = \frac{12}{17}$$

$$x = \sin^{-1} \frac{12}{17}$$

$$x = 44.9$$

SOLVING A RIGHT TRIANGLE

To solve a right triangle, you need to know:

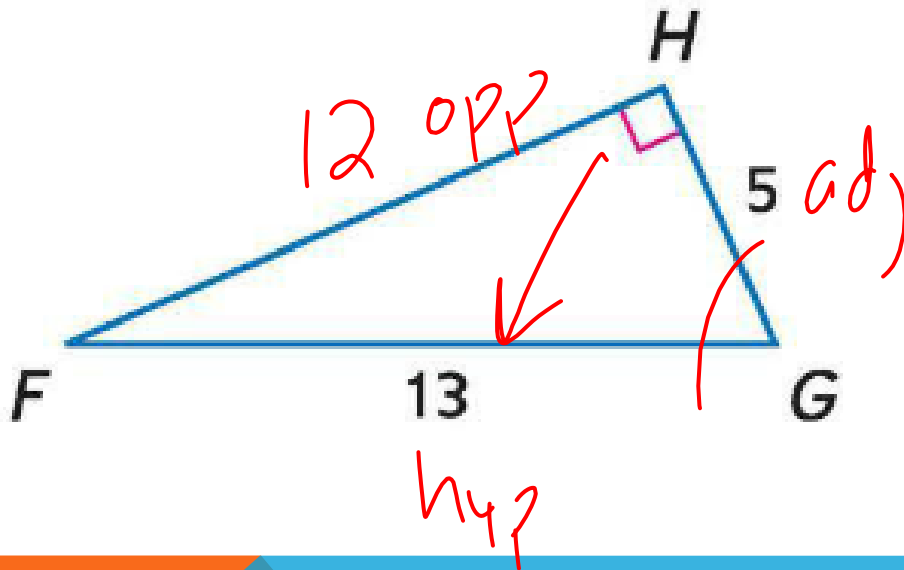
Two side lengths or

One side length and the measure of one acute angle



EXAMPLES

Solve the right triangle. Round side measures to the nearest tenth and angle measures to the nearest degree.



$$\cos G = \frac{5}{13}$$

$$\cos^{-1} \frac{5}{13} = G$$

$$G = 67^\circ$$

$$F = 90 - 67 = 23$$

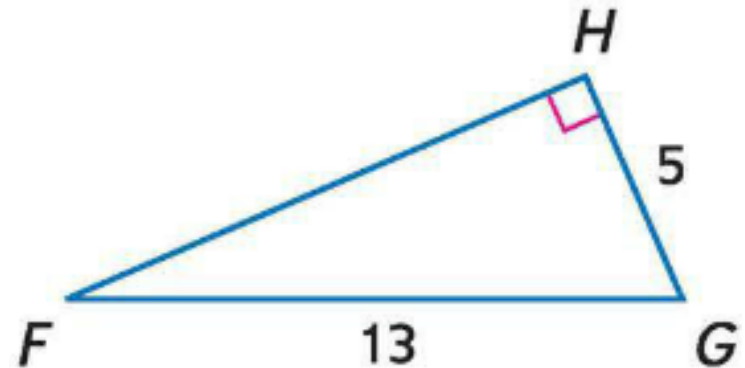
EXAMPLES

Solve the right triangle. Round side measures to the nearest tenth and angle measures to the nearest degree.

$$HF = 12$$

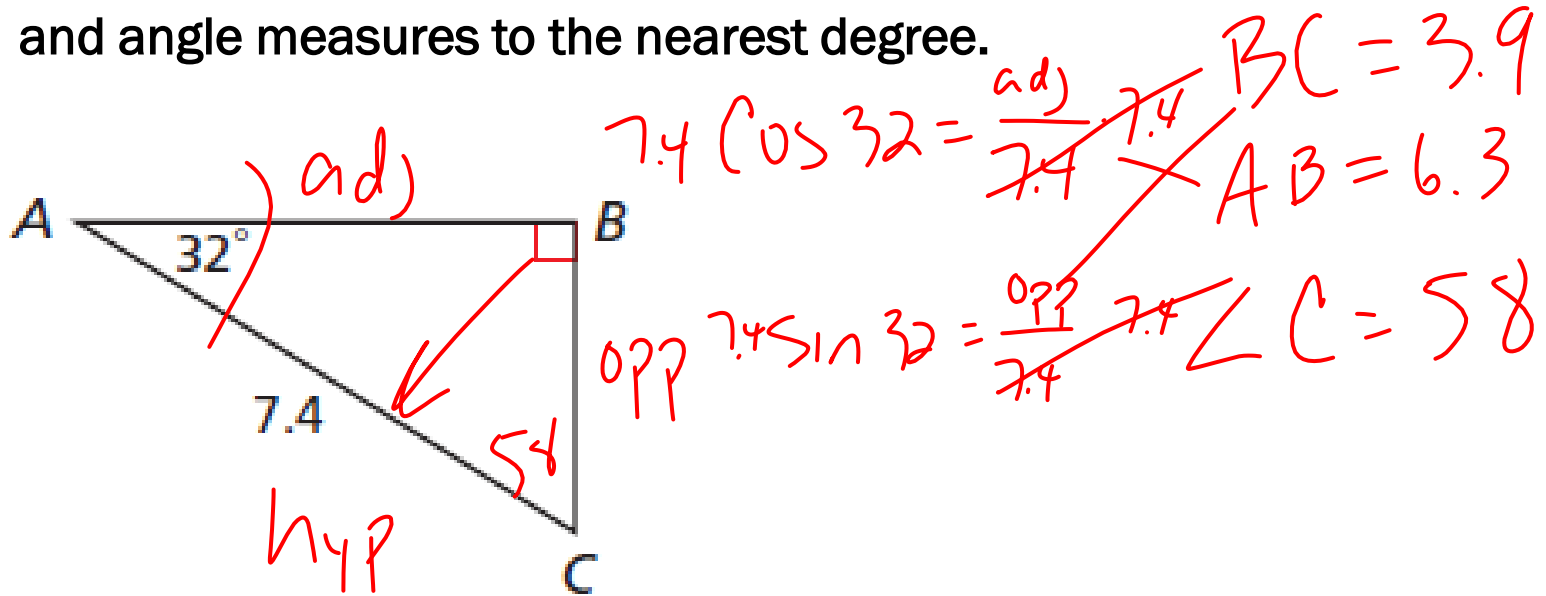
$$\angle F = \sin^{-1} 5/13 = 22.6 = 23$$

$$\angle G = \cos^{-1} 5/13 = 67.4 = 67$$



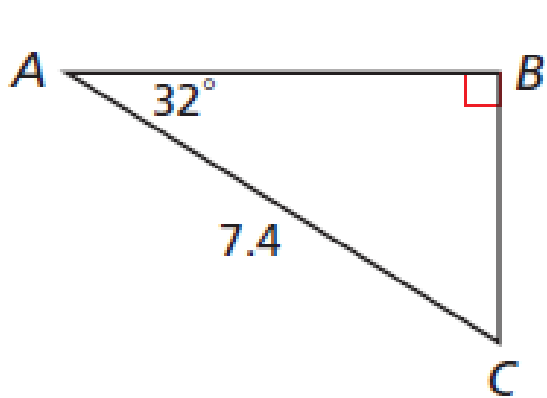
EXAMPLES

Solve the right triangle. Round side measures to the nearest tenth and angle measures to the nearest degree.



EXAMPLES

Solve the right triangle. Round side measures to the nearest tenth and angle measures to the nearest degree.



$$AB: \cos 32 = \frac{AB}{7.4}$$

$$AB = 7.4 \cos 32$$

$$AB = 6.3$$

$$BC: \sin 32 = \frac{BC}{7.4}$$

$$BC = 7.4 \sin 32$$

$$BC = 3.9$$

$$\angle C = 90 - 32 = 58$$