

9.4-9.5 - Introduction to Trigonometry

Three Basic Trigonometric Ratios

Sine \longrightarrow sin

Cosine \longrightarrow cos

Tangent \longrightarrow tan

Must have
right triangles!

Trigonometric Ratios

SOH CAH TOA
S O H C A H T O A

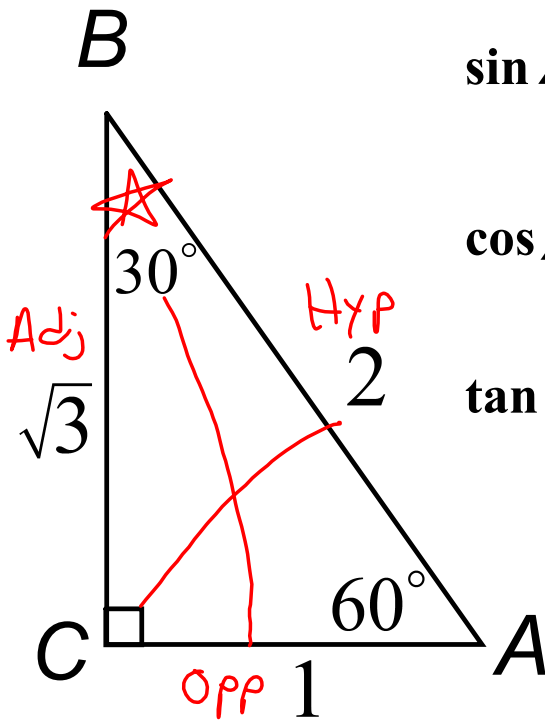
side across the triangle from angle

sine A = $\frac{\text{Opposite}}{\text{Hypotenuse}} = \frac{\text{O}}{\text{H}}$

cosine A = $\frac{\text{Adjacent}}{\text{Hypotenuse}} = \frac{\text{A}}{\text{H}}$

tangent A = $\frac{\text{Opposite}}{\text{Adjacent}} = \frac{\text{O}}{\text{A}}$

Ex 1: 30-60-90 Triangle

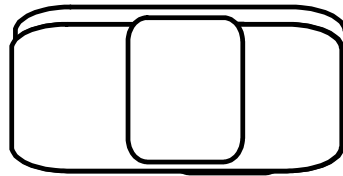


$$\sin \angle B = \frac{\text{Opposite}}{\text{Hypotenuse}} = \frac{1}{2}$$

$$\cos \angle B = \frac{\text{Adjacent}}{\text{Hypotenuse}} = \frac{\sqrt{3}}{2}$$

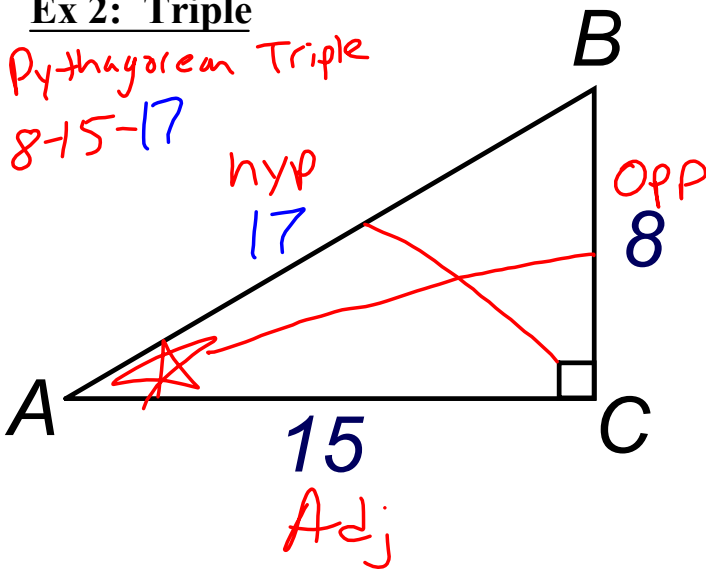
$$\tan \angle B = \frac{\text{Opposite}}{\text{Adjacent}} = \frac{1}{\sqrt{3}}$$

$$= \frac{\sqrt{3}}{3}$$



Ex 2: Triple

Pythagorean Triple
8-15-17



$$\sin \angle A = \frac{O}{H} = \frac{8}{17}$$

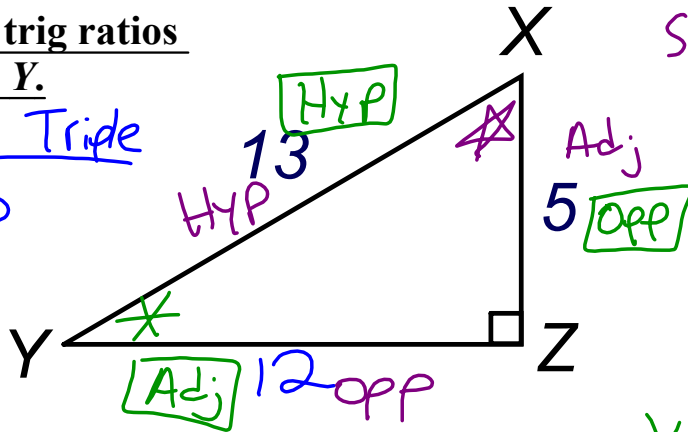
$$\cos \angle A = \frac{A}{H} = \frac{15}{17}$$

$$\tan \angle A = \frac{O}{A} = \frac{8}{15}$$

Ex 3: Find all 3 trig ratios for angles X and Y.

Pythagorean Triple
5-12-13

S^O C^A T^A



$$\sin \angle X = \frac{O}{H} = \frac{12}{13}$$

$$\sin \angle Y = \frac{O}{H} = \frac{5}{13}$$

$$\cos \angle X = \frac{A}{H} = \frac{5}{13}$$

$$\cos \angle Y = \frac{A}{H} = \frac{12}{13}$$

$$\tan \angle X = \frac{O}{A} = \frac{12}{5}$$

$$\tan \angle Y = \frac{O}{A} = \frac{5}{12}$$

Trig Functions

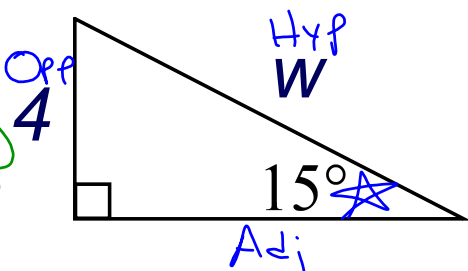
Find the value of w .
Round your answer to the nearest tenth.

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

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

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

Use to find the **SIDE** measures!



- ① Star angle given write O, A, H
- ② Write ratio with SOH-CAH-TOA
- ③ Solve for variable
 - a. multiply by denominator
 - b. divide by trig

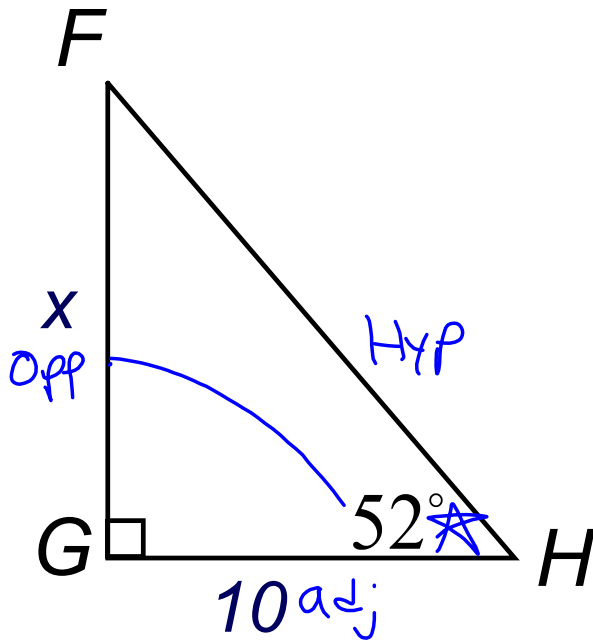
$$w \cdot \sin(15^\circ) = \frac{4}{w} \cdot \frac{O}{H}$$

$$\frac{w \cdot \sin(15^\circ) = 4}{\sin(15^\circ) \sin(15^\circ)}$$

$$w = \frac{4}{\sin(15^\circ)}$$

$w = 15.45$

Ex 4: Find the value of x in the right triangle below.



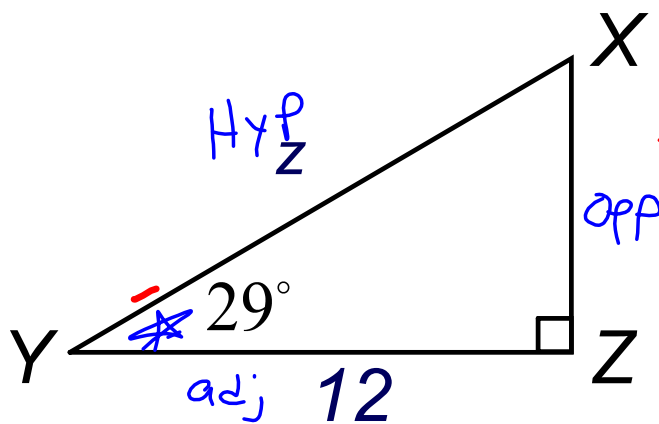
$$10 \cdot \tan(52^\circ) = \frac{x}{10} \cdot 10 \quad \frac{O}{A}$$

$$x = 10 \tan(52^\circ)$$

$$x = 12.799$$

- ① Star angle given write O, A, H
- ② Write ratio with SOA-CAT (TOA)
- ③ Solve for variable
 - a. multiply by denominator
 - b. ~~divide by trig~~

Ex 5: Find value of z in the right triangle below.



$$z \cdot \cos(29^\circ) = \frac{12}{z} \cdot z$$

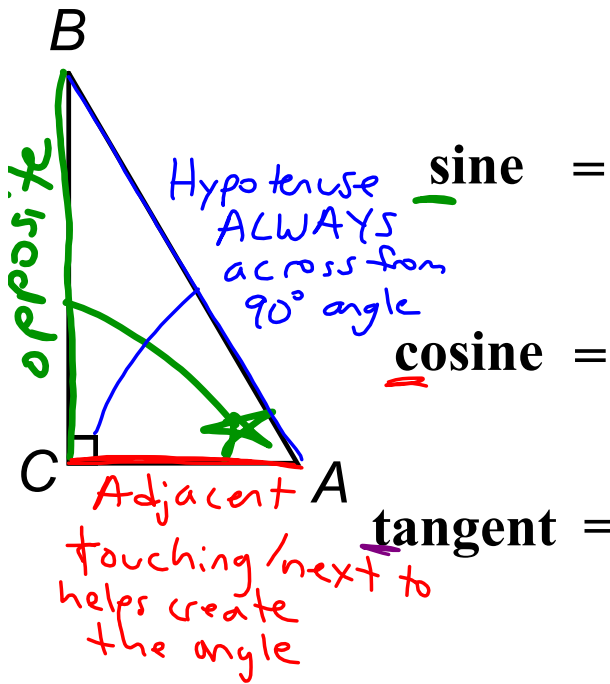
$$\frac{z \cdot \cos(29^\circ)}{\cos(29^\circ)} = \frac{12}{\cos(29^\circ)}$$

$$z = \frac{12}{\cos(29^\circ)}$$

$$z = 13.72$$

- ① Star angle given write O, A, H
- ② Write ratio with SOA-CAT (TOA)
- ③ Solve for variable
 - a. multiply by denominator
 - b. divide by trig

Trigonometric Ratios



SOH CAH TOA

S
O
H
Opposite *across Δ not touching the angle*

$$\frac{\text{Opposite}}{\text{Hypotenuse}} = \frac{\text{O}}{\text{H}}$$

$$\frac{\text{Adjacent}}{\text{Hypotenuse}} = \frac{\text{A}}{\text{H}}$$

$$\frac{\text{Opposite}}{\text{Adjacent}} = \frac{\text{O}}{\text{A}}$$

Geometry (E)

Name _____

Intro to Trigonometry

Period _____

Use a calculator find the value of each trigonometric ratio to the nearest ten-thousandth.

- 1) $\sin 45^\circ$
- 2) $\cos 29^\circ$
- 3) $\tan 22^\circ$
- 4) $\cos 47^\circ$
- 5) $\sin 59^\circ$
- 6) $\tan 49^\circ$

Find the value of each trigonometric ratio.

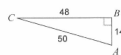
7) $\sin C$



8) $\tan X$



9) $\cos C$



10) $\sin A$



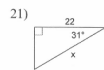
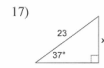
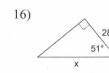
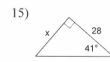
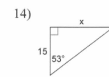
11) $\tan X$



12) $\cos A$



Find the length of the missing side. Round your answer to the nearest tenth.



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Geometry (E)

Name KEY Period

Intro to Trigonometry

Period

Use a calculator find the value of each trigonometric ratio to the nearest ten-thousandth.

1) $\sin 45^\circ$ 0.7071

2) $\cos 29^\circ$ 0.8746

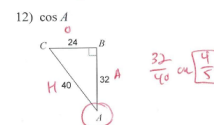
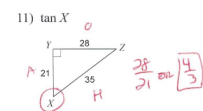
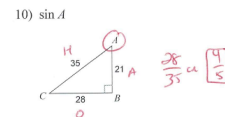
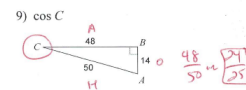
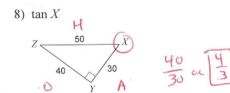
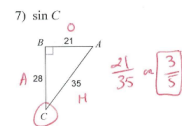
3) $\tan 22^\circ$ 0.4040

4) $\cos 47^\circ$ 0.6820

5) $\sin 59^\circ$ 0.8572


6) $\tan 49^\circ$ 1.1504


Find the value of each trigonometric ratio.





-1-


Find the length of the missing side. Round your answer to the nearest tenth.


13)  $\cos 49^\circ = \frac{24}{x}$
 $x = 24 \cdot \cos 49^\circ$
 $x = 15.7$


14)  $\tan 53^\circ = \frac{15}{x}$
 $x = 15 \cdot \tan 53^\circ$
 $x = 19.9$


15)  $\tan 41^\circ = \frac{x}{28}$
 $x = 28 \cdot \tan 41^\circ$
 $x = 24.3$


16)  $\cos 57^\circ = \frac{28}{x}$
 $x = \frac{28}{\cos 57^\circ}$
 $x = 44.5$


17)  $\sin 37^\circ = \frac{23}{x}$
 $x = 23 \cdot \sin 37^\circ$
 $x = 13.8$

18)  $\tan 40^\circ = \frac{17}{x}$
 $x = \frac{17}{\tan 40^\circ}$
 $x = 20.3$

19)  $\tan 44^\circ = \frac{x}{21}$
 $x = 21 \cdot \tan 44^\circ$
 $x = 20.3$

20)  $\sin 32^\circ = \frac{x}{26}$
 $x = \frac{26}{\sin 32^\circ}$
 $x = 49.1$

21)  $\cos 31^\circ = \frac{22}{x}$
 $x = \frac{22}{\cos 31^\circ}$
 $x = 25.7$

22)  $\sin 24^\circ = \frac{x}{27}$
 $x = 27 \cdot \sin 24^\circ$
 $x = 11.0$