

What's Going On?

Checking In

Minds on

An old friend.

Action!

A new *friend*?

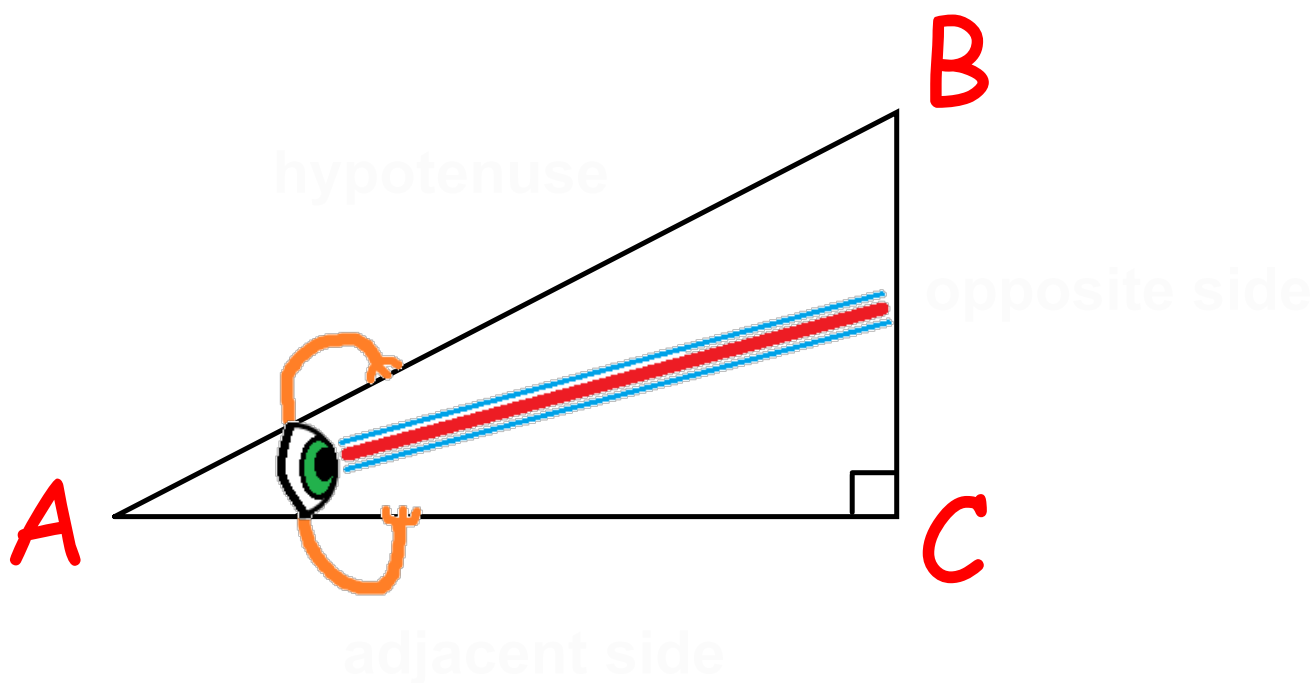
Consolidation

Restrictions

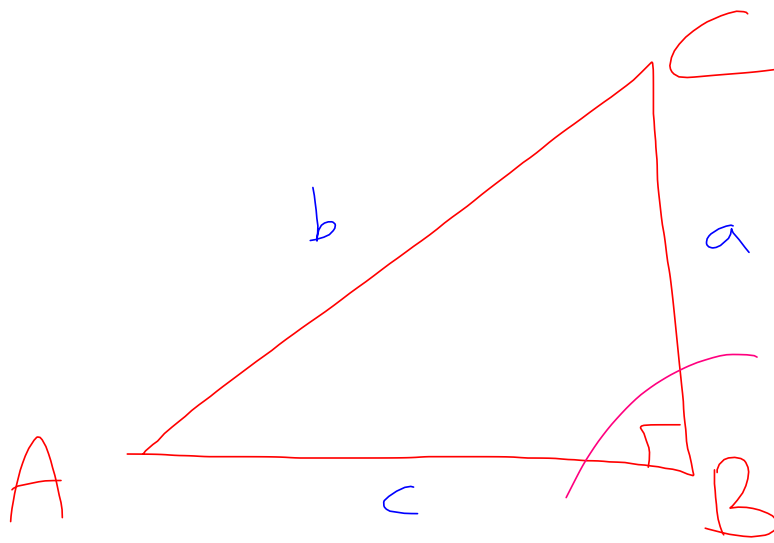
Learning Goal - I will know the reciprocal trigonometric ratios and be able to use them to solve problems.

Minds on

The Angle Monster

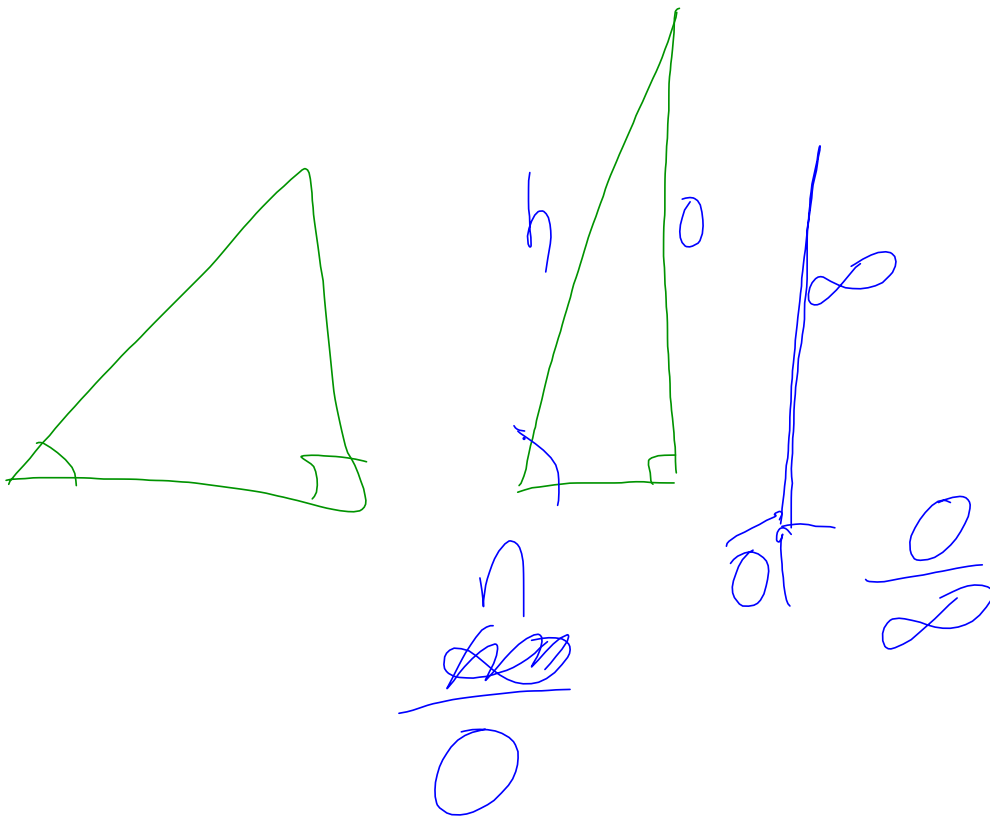


The angle monster always looks at his opposite side and hugs his adjacent side and his hypotenuse.



$$\begin{aligned}\sin 90^\circ &= 1 \\ \cos 90^\circ &= 0\end{aligned}$$

tan 90° = error



 Minds on

An old friend...

It's amazing!

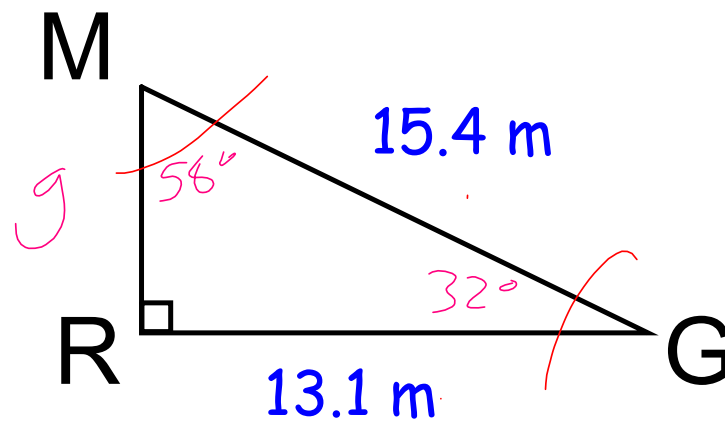
YES!!!!

noah

IT!
LOVE
YOU

Minds on

Using your old friend...



Solve me!

$\triangle MGR$

$$\cos G = \frac{13.1}{15.4}$$

$$\cos G = 0.8506$$

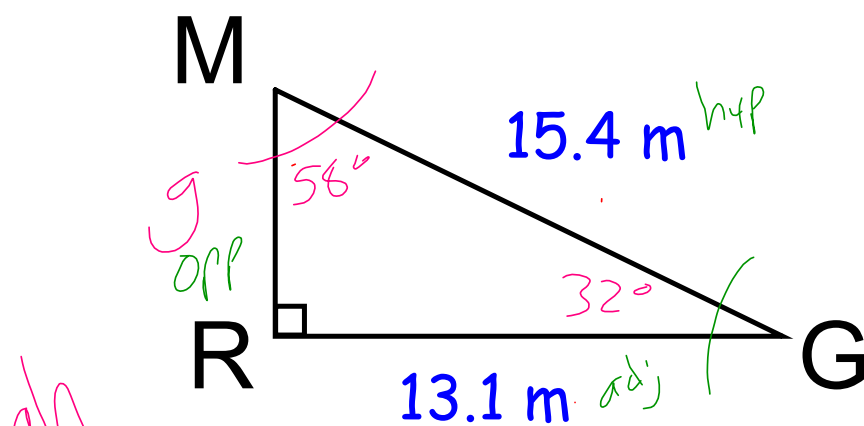
$$G = \cos^{-1}(0.8506)$$

$$G = 32^\circ$$

$$\sin M = \frac{13.1}{15.4}$$

$$\sin M = 0.8506$$

$$M = 58^\circ$$



lil g

$$\tan 32^\circ = \frac{g}{13.1}$$

$$\tan 58^\circ = \frac{13.1}{g}$$

$$\sin 32^\circ = \frac{g}{15.4}$$

$$\cos 58^\circ = \frac{g}{15.4}$$

Action!

Reciprocal Trigonometric Ratios

cosecant

$$\csc \theta = \frac{1}{\sin \theta} = \frac{1}{\frac{\text{opposite}}{\text{hypotenuse}}} = \frac{\text{hypotenuse}}{\text{opposite}}$$

secant

$$\sec \theta = \frac{1}{\cos \theta} = \frac{\text{hypotenuse}}{\text{adjacent}}$$

cotangent

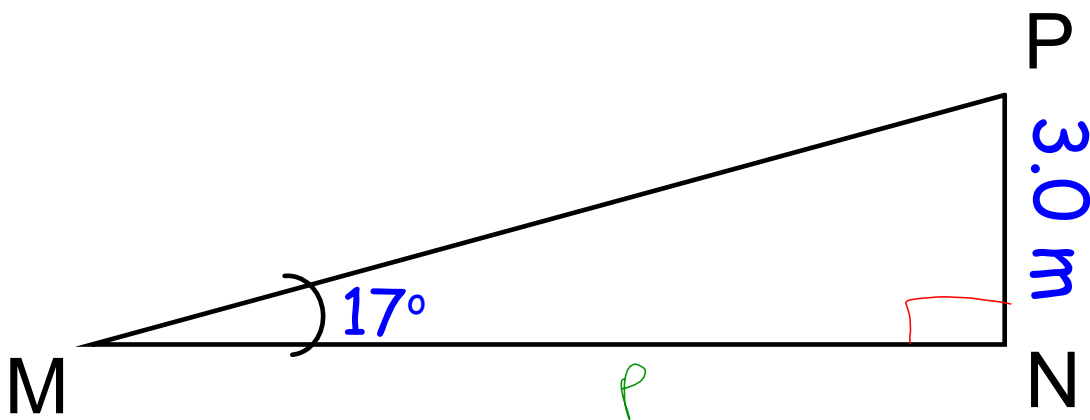
$$\cot \theta = \frac{1}{\tan \theta} = \frac{\text{adjacent}}{\text{opposite}}$$

Action!

Reciprocal Trigonometric Ratios

Why?

Determine the length of side p (MN)



$$\tan 17^\circ = \frac{3}{p}$$

too

$$\cot 17^\circ = \frac{p}{3}$$

$$p = 3 \times \cot 17^\circ$$

$$p = 3 \times \frac{1}{\tan 17^\circ}$$

Action!

A new friend?

choshacao

soh cah toa

Selling price

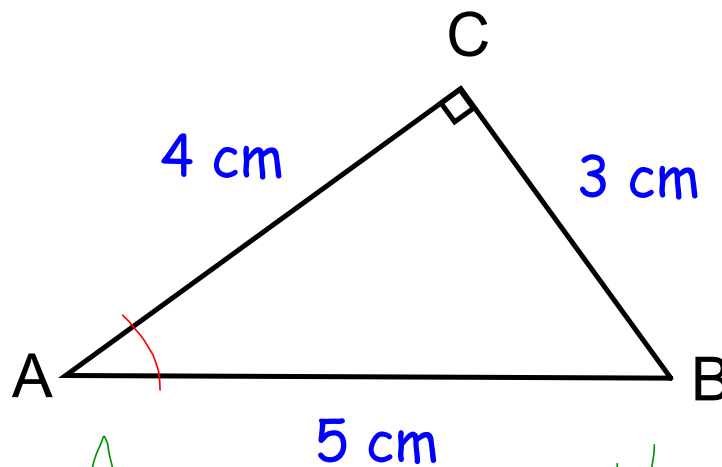
Action!

The Ratios

Determine **all 6** trigonometric ratios for triangle ABC.

Which ratio is the largest?

Which ratio is the smallest?



angle A

$$\begin{aligned} * \sin A &= \frac{3}{5} = 0.6 \\ \cos A &= \frac{4}{5} = 0.8 \\ \tan A &= \frac{3}{4} = 0.75 \\ * \csc A &= \frac{5}{3} = 1.67 \\ \sec A &= \frac{5}{4} = 1.25 \\ \cot A &= \frac{4}{3} = 1.33 \end{aligned}$$

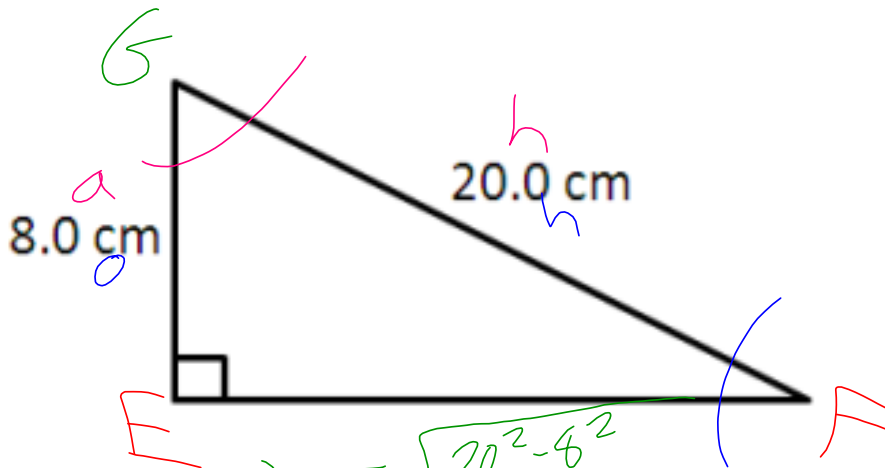
angle B

$$\begin{aligned} \sin B &= \frac{4}{5} = 0.8 \\ \cos B &= \frac{3}{5} = 0.6 \\ \tan B &= \frac{4}{3} = 1.33 \\ \csc B &= \frac{5}{4} = 1.25 \\ \sec B &= \frac{5}{3} = 1.67 \\ \cot B &= \frac{3}{4} = 0.75 \end{aligned}$$

Action!

a. Determine the length of EF to one decimal place.

b. Express one unknown angle in terms of a primary trigonometric ratio and the other in terms of a reciprocal ratio and calculate the angles.



sin
cos
tan

csc
sec
cot

a) $g = \sqrt{20^2 - 8^2}$
 $g = \sqrt{336}$
 $g = 18.3 \text{ cm}$

b) $\cos G = \frac{8}{20}$
 $\cos G = 0.4$
 $G = 66^\circ$

$\sin F = \frac{8}{20}$

$\csc F = \frac{20}{8}$
 $\csc F = 2.5$
 $\sin F = \frac{1}{2.5}$
 $F = \sin^{-1}\left(\frac{1}{2.5}\right)$
 $F = 24^\circ$

Consolidation

Restrictions

What are the restrictions on the 6 trigonometric ratios?

- $\sin \theta$ and $\cos \theta$ are always less than 1

↓
You're dividing by
hypotenuse

↓ longest side!!

$$4 \times 2^{x-3} + 4 = -2 \times 2^{x-2} + 12$$

$$\frac{4 \times 2^{x-3} - 8}{-2} = \frac{-2 \times 2^{x-2}}{-2}$$

$$\frac{2 \times 2^{x-3} + 4}{-2} = \frac{2^{x-2}}{-2}$$

$$2^{x-3} - 2 = -2^{x-2}$$

$$2^{x-3} + 2^{x-2} - 2 = 0$$

$$2^{x-3} - 2 + 2 = 0$$

$$2^{x-3} - 1 = 0$$

$$2^{x-3} = 1$$