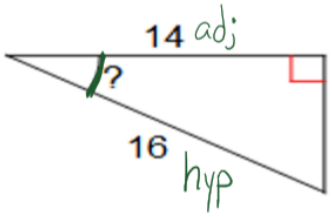
Goals For Today

SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.

SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

We know all about finding side lengths in right triangles, but what about finding <u>angle measures</u>?

Ex. 1. Find the measure of '?'



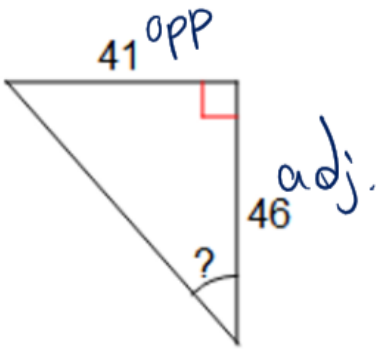
$\cos(?) = \frac{14}{16}$

Inverse Cosine used to cancel out cosine.

$? = \cos^{-1}\left(\frac{14}{16}\right)$

$? = 28.955°$

Ex. 2 Find the measure of '?'

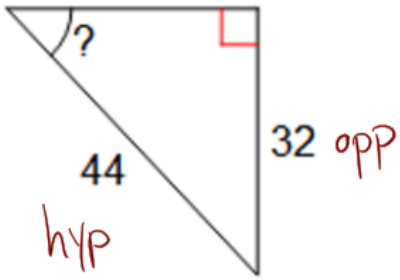


$\tan(?) = \frac{41}{46}$

$? = \tan^{-1}\left(\frac{41}{46}\right)$

$? = 41.711°$

Ex. 3 Find the measure of '?'

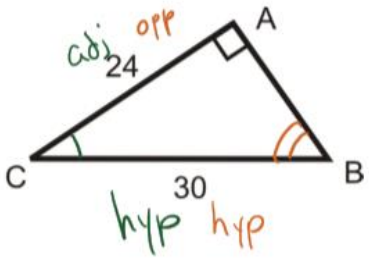


$\sin(?) = \frac{32}{44}$

$? = \sin^{-1}\left(\frac{32}{44}\right)$

$? = 46.658°$

Use the following triangle to find the indicated angles.



Find the m∠C.

$\cos(C) = \frac{24}{30}$

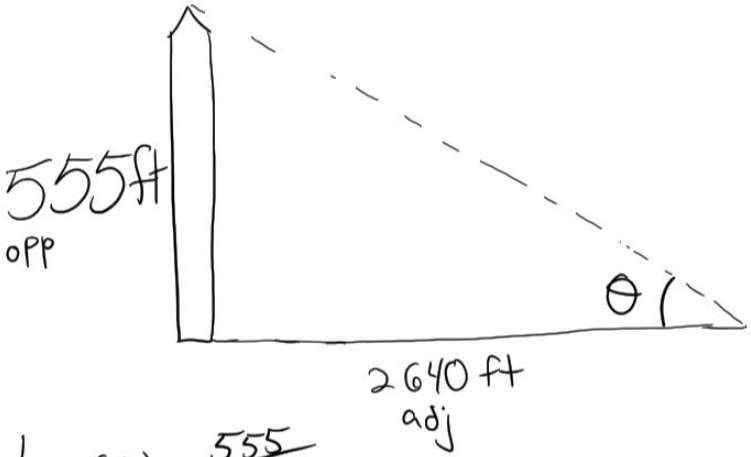
$C = \cos^{-1}\left(\frac{24}{30}\right) = 36.870°$

Find the m∠B.

$\sin(B) = \frac{24}{30}$

$B = \sin^{-1}\left(\frac{24}{30}\right) = 53.130°$

Ex. 5 The Washington Monument is 555 feet tall. Find the angle of elevation, if you view the monument from 2640 feet away?



$\tan(\theta) = \frac{555}{2640}$

$\theta = \tan^{-1}\left(\frac{555}{2640}\right)$

$\theta = 11.872°$

4 CORNERS

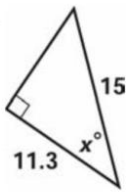
You Try

Go to the corner of the room with the correct answer.

$\tan(x)=\frac{15}{11.3}$

$\sin(x)=\frac{11.3}{15}$

1.



$\cos(x)=\frac{11.3}{15}$

$\tan(x)=\frac{11.3}{15}$

4 CORNERS

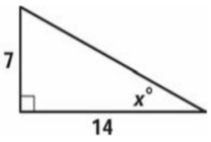
You Try

Go to the corner of the room that you think has the right equation.

$\cos(x)=\frac{7}{14}$

$\tan(x)=\frac{7}{14}$

3.



$\tan(x)=\frac{14}{7}$

$\sin(x)=\frac{7}{14}$

4 CORNERS

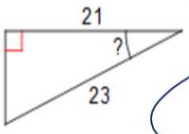
You Try

Go to the corner of the room that you think has the right equation.

$\cos(?)=\frac{23}{21}$

$\cos(23)=\frac{21}{?}$

7.

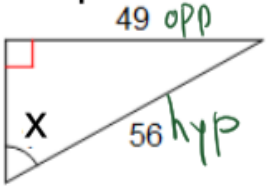


$\sin(?)=\frac{21}{23}$

$\cos(?)=\frac{21}{23}$

Recap

1. Explain how you would find the value of x.



$\sin(x)=\frac{49}{56}$

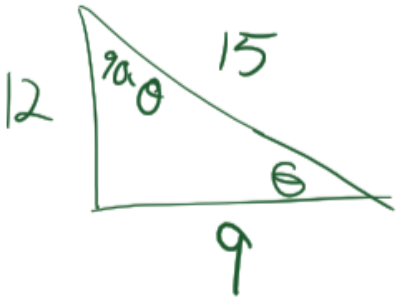
$x=\sin^{-1}\left(\frac{49}{56}\right)=61.045°$

2. If sin(θ) = 12/15, find the following.

cos(θ)= $\frac{9}{15}$

tan(θ)= $\frac{12}{9}$

sin(90-θ)= $\frac{9}{15}$



$12^2+b^2=15^2$

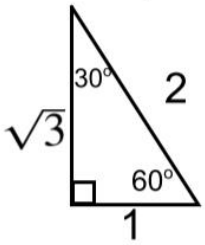
$144+b^2=225$

$b^2=81$

$b=9$

Complementary Trig. Functions

Example 1:



$\cos(30°) = \frac{\sqrt{3}}{2}$

$\sin(60°) = \frac{\sqrt{3}}{2}$

Why are the called complementary?

The cosine of an angle is equal to the sine of the angles complement.

Complementary Trig. Functions

Example 2:

In ΔWIN, $\cos(W)=3/5$, if $\angle I$ is the right angle, what does the sin(N) equal?

$\sin(N) = \frac{3}{5}$

Complementary Trig. Functions

Example 3:

In ΔFLY, $\angle F$ and $\angle Y$ are the acute angles. What trig. function would be equal to the cos(F)?

$\cos(F) = \sin(Y)$

Complementary Trig. Functions

Example 4:

What trigonometric function is equal to the cos(51°)? $90 - 51 = 39$

$\sin(39)$

4 Corners — Go to the corner that the correct answer is in.

cos(N) | sin(N)

1. In ΔMNO, where O is a right angle, what trig. function is congruent to $\cos(M)$?

sin(M) | cos(O)

4 Corners — Go to the corner that the correct answer is in.

sin(B)=3/5 | sin(B)=5/3

3. The $\cos(A) = \frac{3}{5}$ in ΔABC. What is the $\sin(B)$ if $\angle C$ is the right angle?

sin(B) = 4/5 | Not enough informatior to determine.

4 Corners — Go to the corner that the correct answer is in.

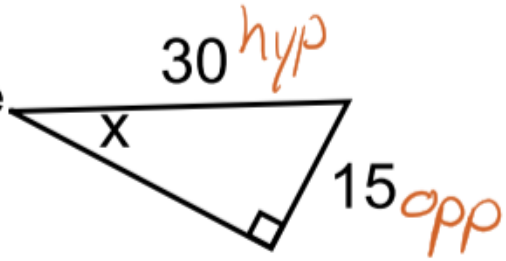
sin(18°) | There is no trig. function equal to it.

7. What trigonometric function is equal to $\cos(82^o)$?

cos(8°) | sin(8°)

Recap:

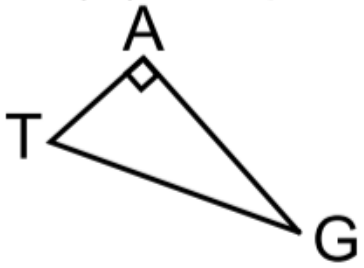
1. Find the value of the missing angle



$\sin(x) = \frac{15}{30}$

$x = \sin\left(\frac{15}{30}\right) = 30°$

2. What other trig. function would the cos(G) be equal to in reference to the given triangle?



$\cos(G) = \sin(T)$