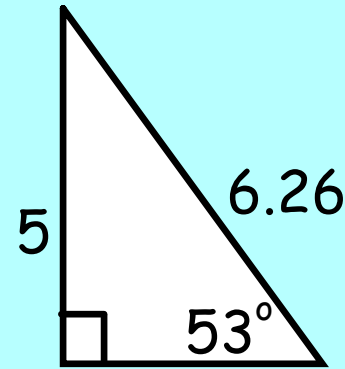


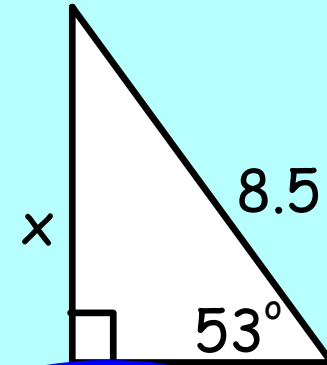
## 2/6/20 - Warm Up Problem

1. Find the leg/hypotenuse ratio for the first triangle.



2. Use the ratio to find the value of x on the second triangle.

$$\frac{8.5}{1.252}$$



$$\frac{5}{6.26} = 0.798$$

$$\frac{x}{8.5} = 0.798$$

$$x = 6.789$$

# Concept 20 - Trigonometry

**Goal:** write trigonometric ratios

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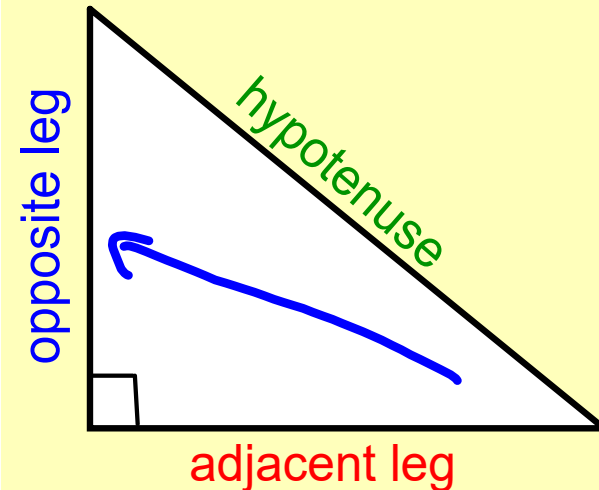
**Trigonometric Ratio:** a ratio of 2 sides of a right triangle

"theta": greek letter used to represent an angle measure

**Sine**       $\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$

**Cosine**       $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$

**Tangent**       $\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$



**SOH**  
S  
O  
H  
S  
O  
H

**CAH**  
C  
A  
H  
C  
A  
H

**TOA**  
T  
O  
A  
T  
O  
A

# Write Sine, Cosine, and Tangent Ratios

Find each ratio and express it as a fraction.

$$\sin R = \frac{4}{5}$$

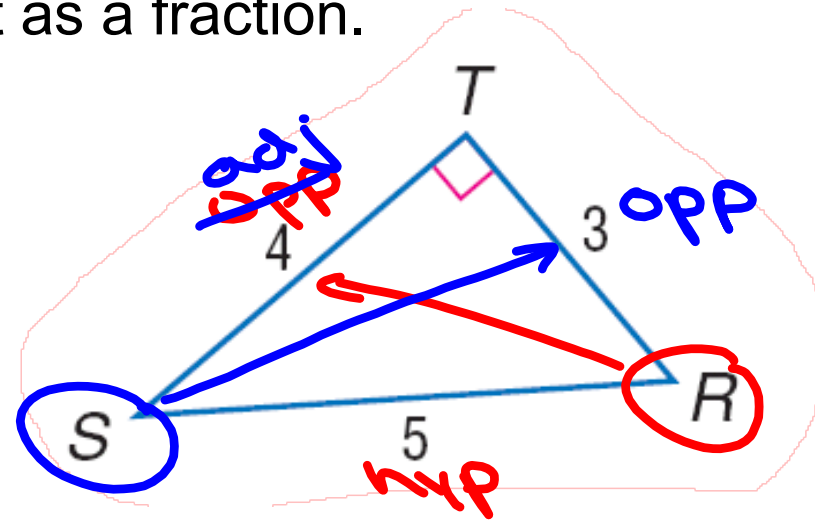
$$\cos R = \frac{3}{5}$$

$$\tan R = \frac{4}{3}$$

$$\sin S = \frac{3}{5}$$

$$\cos S = \frac{4}{5}$$

$$\tan S = \frac{3}{4}$$



SOH CAH TOA

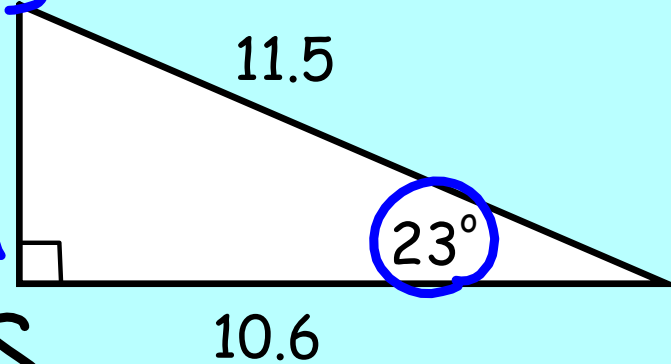
Write each ratio as a fraction. Then, calculate it as a decimal rounded to the nearest hundredth.

$$\sin 23^\circ = \frac{4.5}{11.5} = .3913$$

$$\cos 23^\circ = \frac{10.6}{11.5} = .9217$$

$$\tan 23^\circ =$$

$$\frac{4.5}{10.6} = 0.42$$

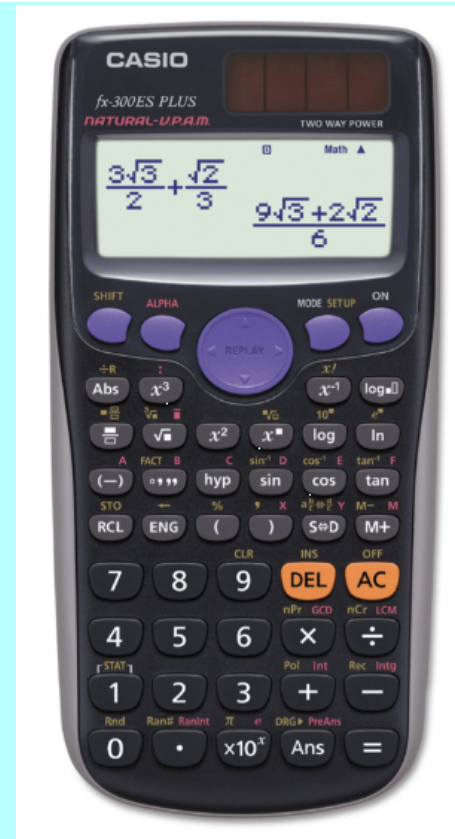


Angle	Sine	Cosine	Tangent	Angle	Sine	Cosine	Tangent
1°	.0175	.9998	.0175	46°	.7193	.6947	1.0355
2°	.0349	.9994	.0349	47°	.7314	.6820	1.0724
3°	.0523	.9986	.0524	48°	.7431	.6691	1.1106
4°	.0698	.9976	.0699	49°	.7547	.6561	1.1504
5°	.0872	.9962	.0875	50°	.7660	.6428	1.1918
6°	.1045	.9945	.1051	51°	.7771	.6293	1.2349
7°	.1219	.9925	.1228	52°	.7880	.6157	1.2799
8°	.1392	.9903	.1405	53°	.7986	.6018	1.3270
9°	.1564	.9877	.1584	54°	.8090	.5878	1.3764
10°	.1736	.9848	.1763	55°	.8192	.5736	1.4281
11°	.1908	.9816	.1944	56°	.8290	.5592	1.4826
12°	.2079	.9781	.2126	57°	.8387	.5446	1.5399
13°	.2250	.9744	.2309	58°	.8480	.5299	1.6003
14°	.2419	.9703	.2493	59°	.8572	.5150	1.6643
15°	.2588	.9659	.2679	60°	.8660	.5000	1.7321
16°	.2756	.9613	.2867	61°	.8746	.4848	1.8040
17°	.2924	.9563	.3057	62°	.8829	.4695	1.8807
18°	.3090	.9511	.3249	63°	.8910	.4540	1.9626
19°	.3256	.9455	.3443	64°	.8988	.4384	2.0503
20°	.3420	.9397	.3640	65°	.9063	.4226	2.1445
21°	.3584	.9336	.3839	66°	.9135	.4067	2.2460
22°	.3746	.9272	.4040	67°	.9205	.3907	2.3559
23°	.3907	.9205	.4245	68°	.9272	.3746	2.4751
24°	.4067	.9135	.4452	69°	.9336	.3584	2.6051
25°	.4226	.9063	.4663	70°	.9397	.3420	2.7475
26°	.4384	.8988	.4877	71°	.9455	.3256	2.9042
27°	.4540	.8910	.5095	72°	.9511	.3090	3.0777
28°	.4695	.8829	.5317	73°	.9563	.2924	3.2709
29°	.4848	.8746	.5543	74°	.9613	.2756	3.4874
30°	.5000	.8660	.5774	75°	.9659	.2588	3.7321
31°	.5150	.8572	.6009	76°	.9703	.2419	4.0108
32°	.5299	.8480	.6249	77°	.9744	.2250	4.3315
33°	.5446	.8387	.6494	78°	.9781	.2079	4.7046
34°	.5592	.8290	.6745	79°	.9816	.1908	5.1446
35°	.5736	.8192	.7002	80°	.9848	.1736	5.6713
36°	.5878	.8090	.7265	81°	.9877	.1564	6.3138
37°	.6018	.7986	.7536	82°	.9903	.1392	7.1154
38°	.6157	.7880	.7813	83°	.9925	.1219	8.1443
39°	.6293	.7771	.8098	84°	.9945	.1045	9.5144
40°	.6428	.7660	.8391	85°	.9962	.0872	11.4301
41°	.6561	.7547	.8693	86°	.9976	.0698	14.3007
42°	.6691	.7431	.9004	87°	.9986	.0523	19.0811
43°	.6820	.7314	.9325	88°	.9994	.0349	28.6363
44°	.6947	.7193	.9657	89°	.9998	.0175	57.2900
45°	.7071	.7071	1.0000				

## Trig Ratios on the Calculator

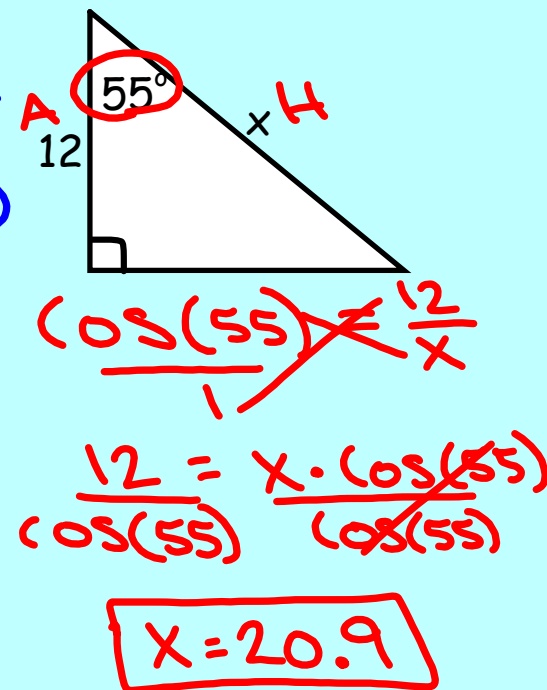
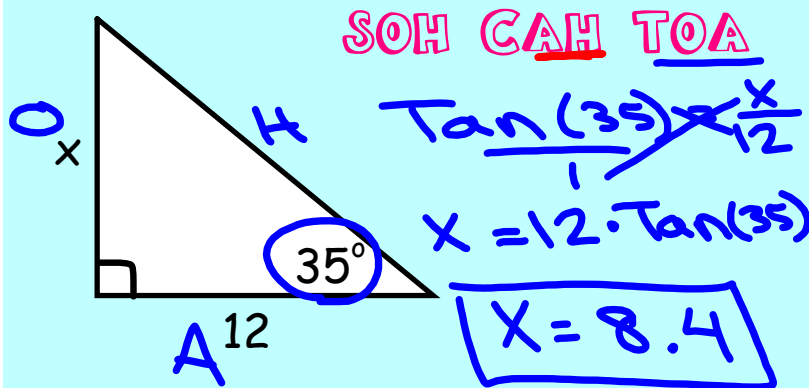
- make sure to set your calculator to DEGREES not RADIANS

$$\sin(23) = .39$$



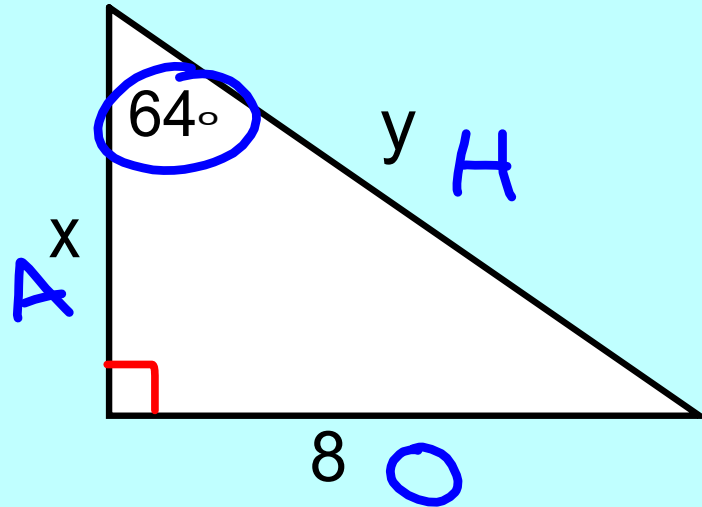
## Finding a Missing Side

1. Locate  $\theta$  and label sides: O, A, H
2. Decide which ratio you need to use.
  - should contain one side you know and one side you want to find
3. Write a trig equation.
4. Solve the equation.
  - turn it into a proportion and cross-multiply





Find the value of  $x$  and  $y$  using trigonometry.



SOH CAH TOA

$$\frac{\tan(64)}{1} = \frac{8}{x}$$

$$\frac{8}{\tan(64)} = \frac{x \cdot \tan(64)}{\tan(64)}$$

$$\underline{3.9 = x}$$

$$\frac{\sin(64)}{1} = \frac{8}{y}$$

$$\frac{8}{\sin(64)} = \frac{y \cdot \sin(64)}{\sin(64)}$$

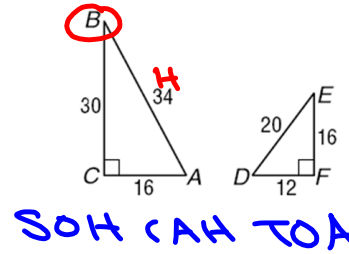
$$\underline{8.9 = y}$$

**Assignment:**  
 Concept 20 Worksheet (1-13)

WRITING TRIG RATIOS

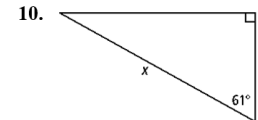
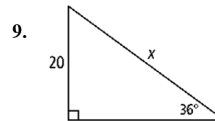
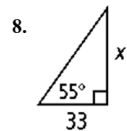
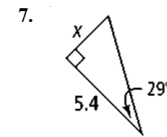
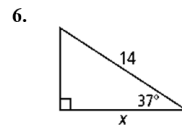
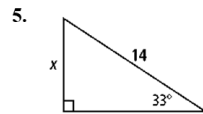
Write the indicated trigonometric ratios as fractions.

1.  $\sin A = \frac{30}{34}$      $\cos A = \frac{16}{34}$      $\tan A = \frac{30}{16}$   
 2.  $\sin B = \frac{16}{34}$      $\cos B = \frac{30}{34}$      $\tan B = \frac{30}{16}$   
 3.  $\sin D =$      $\cos D =$      $\tan D =$   
 4.  $\sin E =$      $\cos E =$      $\tan D =$



FINDING MISSING SIDE LENGTHS

Write and solve a trigonometric equation to find the value of x for each triangle. Round to the nearest tenth.



Write and solve two trigonometric equations to find the value of x and y in each triangle. Round answers to the nearest tenth.

