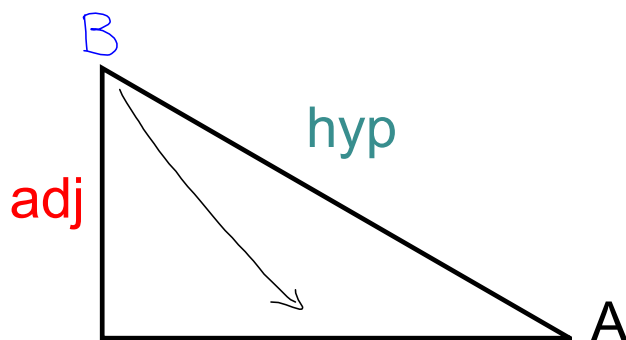# Primary Trigonometric Ratios

Learning Goal

Getting Started: Terminology

i) With angle A as the *reference angle*, label the sides (opposite, adjacent, and hypotenuse).
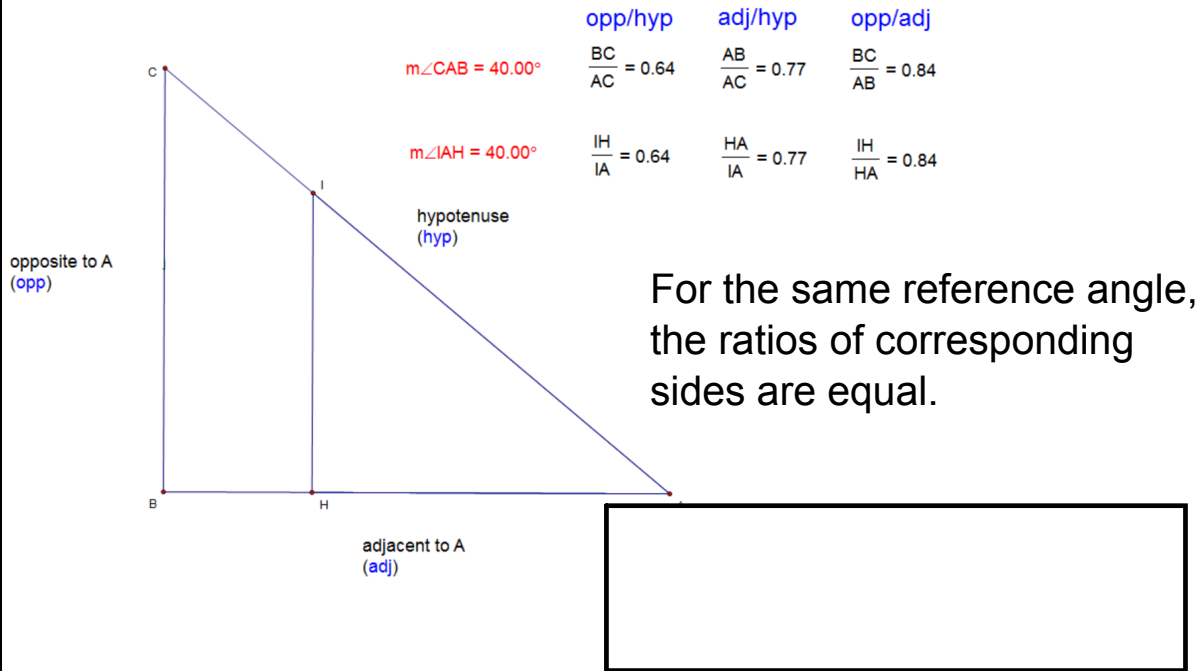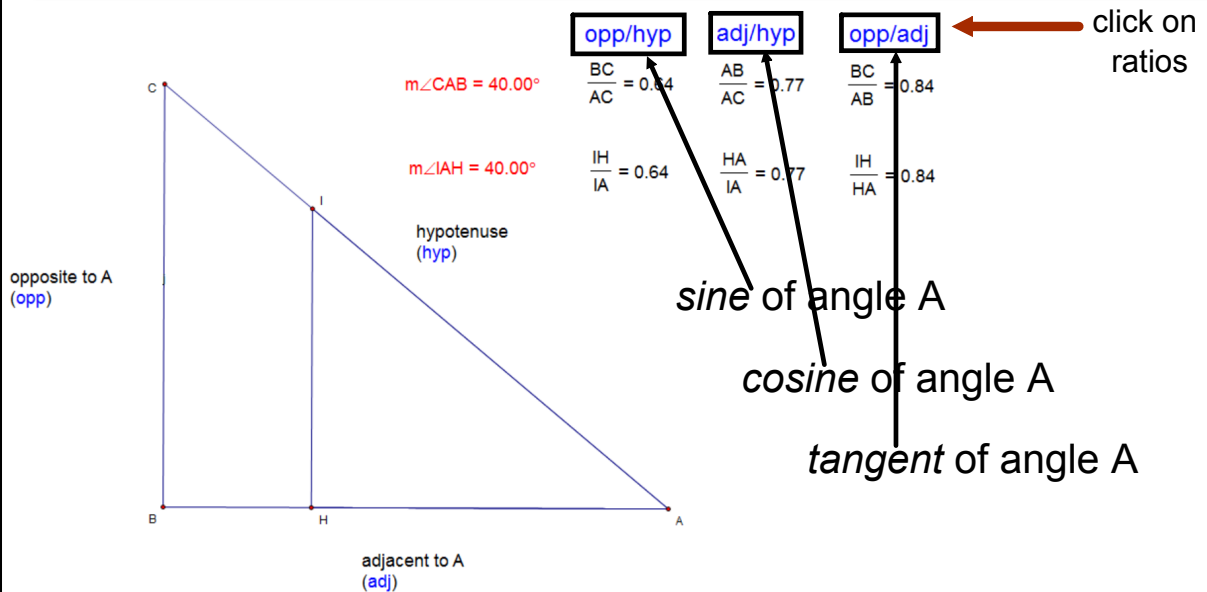
opp

adj

hyp

ii)

Consider how your labeling changes with angle B as your reference angle.

Some of Your Noticings

	opp/hyp	adj/hyp	opp/adj
m∠CAB = 40.00°	$\dfrac{BC}{AC} = 0.64$	$\dfrac{AB}{AC} = 0.77$	$\dfrac{BC}{AB} = 0.84$
m∠IAH = 40.00°	$\dfrac{IH}{IA} = 0.64$	$\dfrac{HA}{IA} = 0.77$	$\dfrac{IH}{HA} = 0.84$

hypotenuse (hyp)

opposite to A (opp)

adjacent to A (adj)

For the same reference angle, the ratios of corresponding sides are equal.

Definitions: The Primary Trigonometric Ratios

click on ratios

	opp/hyp	adj/hyp	opp/adj
m∠CAB = 40.00°	$\dfrac{BC}{AC} = 0.64$	$\dfrac{AB}{AC} = 0.77$	$\dfrac{BC}{AB} = 0.84$
m∠IAH = 40.00°	$\dfrac{IH}{IA} = 0.64$	$\dfrac{HA}{IA} = 0.77$	$\dfrac{IH}{HA} = 0.84$

hypotenuse (hyp)

opposite to A (opp)

adjacent to A (adj)

sine of angle A

cosine of angle A

tangent of angle A

Writing Trigonometric Equations

m∠CAB = 40.00°

m∠IAH = 40.00°

opposite to A
(opp)

hypotenuse
(hyp)

adjacent to A
(adj)

opp/hyp	adj/hyp	opp/adj
$\frac{BC}{AC} = 0.64$	$\frac{AB}{AC} = 0.77$	$\frac{BC}{AB} = 0.84$
$\frac{IH}{IA} = 0.64$	$\frac{HA}{IA} = 0.77$	$\frac{IH}{HA} = 0.84$

$$\tan 40° = \frac{BC}{AB} \doteq 0.84$$

In this case, where
A = 40⁰, ...

$$\sin 40° = \frac{BC}{AC} \doteq 0.64$$

$$\cos 40° = \frac{AB}{AC} \doteq 0.77$$

What About Different-sized Angles?

| Angle	Sine	Cosine	Tangent
1°	.0175	.9998	.0175
2°	.0349	.9994	.0349
3°	.0523	.9986	.0524
4°	.0698	.9976	.0699
5°	.0872	.9962	.0875
31°	.5150	.8572	.6009
32°	.5299	.8480	.6249
33°	.5446	.8387	.6494
34°	.5592	.8290	.6745
35°	.5736	.8192	.7002
71°	.9455	.3256	2.9042
72°	.9511	.3090	3.0777
73°	.9563	.2924	3.2709
74°	.9613	.2756	3.4874
75°	.9659	.2588	3.7321

...and so on...

...and so forth...

Let's see if we've got this...

E.g., 1.

Draw a right triangle that would represent each of the following trigonometric expressions:

a) $\tan 34^0 \doteq \dfrac{0.6745}{1}$ b) $\sin 78^0$ c) $\cos 49^0$
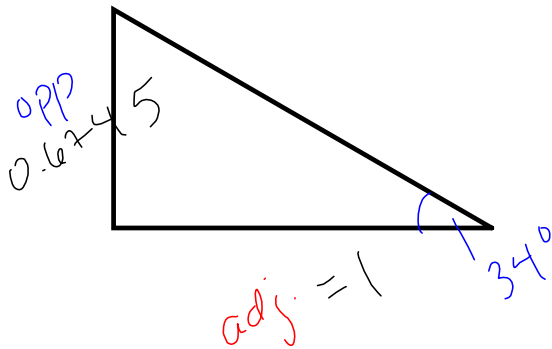
Let's see if we've got this...

E.g., 2.

Decide if the each statement is true or false. Justify your decision.

a) $\sin \theta = 0.4$
b) $\tan \alpha = 2$
c) $\cos \alpha \doteq 0.8929$
d) $\cos \theta \doteq 0.8929$

Triangle: α, 2.5 m, 5.6 m, 5.0 m, θ