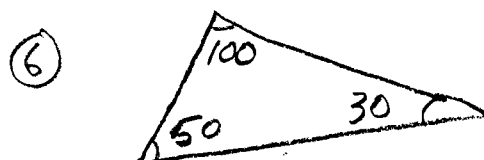
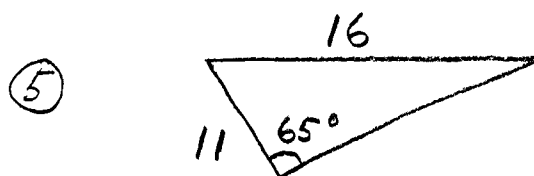
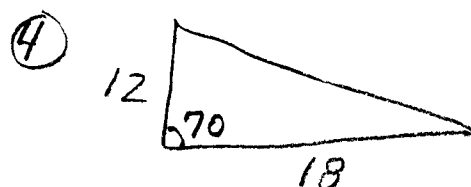
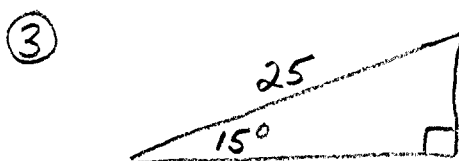
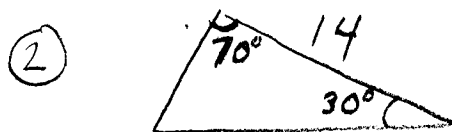
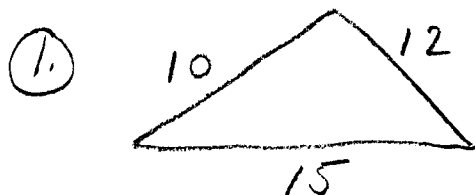
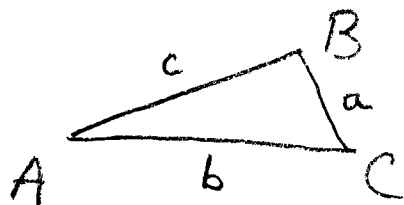


BE - Geometry I Monday 1-17-11

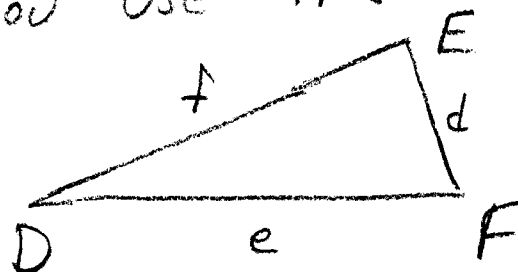
NAME THE tools you would use to solve EACH triangle:



⑦ WHAT tools can you use IF:



~



① SSS $\Rightarrow$ LOC ② ASA $\Rightarrow$ LOS

③ Right $\Delta \Rightarrow$ P.T. + SOHCAHTOA

④ SAS $\Rightarrow$ LOC

"ACOTLOS"

⑤ SSA $\Rightarrow$ LOC, solve quadratic

⑥ AAA $\Rightarrow$ NONE

⑦ $A \cong D, B \cong E, C \cong F$ AND $\frac{a}{d} = \frac{b}{e} = \frac{c}{f}$

WIDGETS??

THE RECIPROCAL TRIG. FUNCTIONS

$$\sin \theta = \frac{o}{h}$$

$$\cos \theta = \frac{a}{h}$$

$$\tan \theta = \frac{o}{a}$$

$\frac{h}{o} = \csc \theta$
$\frac{h}{a} = \sec \theta$
$\frac{a}{o} = \cot \theta$

"cosecant"

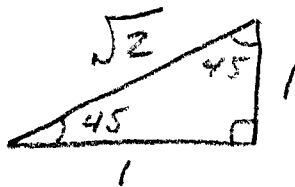
"secant"

"cotangent"

Ⓔ FIND THE EXACT VALUE OF:

Ⓐ $\csc 45^\circ$

Since $\sin 45^\circ \Rightarrow$

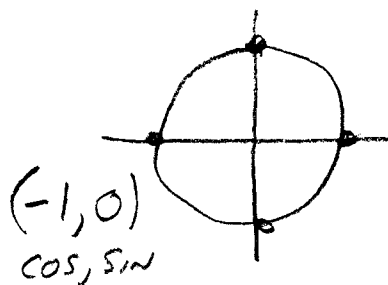


$$\sin 45^\circ = \frac{1}{\sqrt{2}}$$

$$\boxed{\csc 45^\circ = \sqrt{2}}$$

Ⓑ $\sec 180^\circ$

Since $\cos 180^\circ \Rightarrow$



$$\cos 180^\circ = -1$$

$$\boxed{\sec 180^\circ = -1}$$

identity AN EQUATION WHICH IS true for every VALUE of the variable.

Ⓔ $2(x+1) = 2x + 2$

$$\begin{array}{r} 2x + 2 = 2x + 2 \\ -2x \quad \quad -2x \end{array}$$

$$2 = 2 \quad \text{TRUE FOR ALL VALUES OF } x$$

IDENTITY

Trigonometric Identities ARE equations involving trig. functions that are true for any angle. There are many, many trig. identities and a big part of most trig. classes is proving whether or not a particular trig. identity is true.

(EX) Show THAT $\sin \theta = \frac{1}{\csc \theta}$

proof: $\sin \theta = \frac{O}{H}$, $\csc \theta = \frac{H}{O}$

$$\therefore \frac{O}{H} = \frac{1}{\frac{H}{O}}$$

$$\frac{O}{H} = \frac{1}{1} \cdot \frac{O}{H} \quad \checkmark$$

ALSO:

$$\sin \theta = \frac{1}{\csc \theta}$$

$$\cos \theta = \frac{1}{\sec \theta}$$

$$\tan \theta = \frac{1}{\cot \theta}$$

These ARE called the
Reciprocal Identities

There ARE OTHER common trig.
identities that are grouped/named

NOTE:

There is a convention used in writing trig. functions that are squared.

$$\sin \theta \cdot \sin \theta = (\sin \theta)^2$$

is normally written = $\sin^2 \theta$

Be careful, this is NOT the

same as $\sin(\theta)^2$ which means $\sin(\theta \cdot \theta)$

$$\textcircled{\text{EX}} \sin^2 45^\circ = (.7071)^2 \approx .499990$$

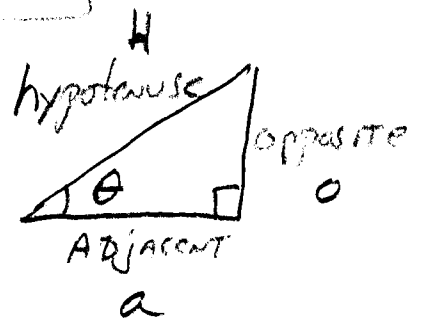
$$\textcircled{\text{EXACT}} \sin^2 45^\circ = \left(\frac{\sqrt{2}}{2}\right)^2 = \frac{2}{4} = .5$$

Summary $\sin^2 \theta = (\sin \theta)^2$

Here is ONE OF THE most important and most often seen (think ACT) trig. identities:

$$\sin^2 \theta + \cos^2 \theta = 1$$

Proof: $\left(\frac{o}{H}\right)^2 + \left(\frac{a}{H}\right)^2 = 1$



$$\frac{o^2}{H^2} + \frac{a^2}{H^2} = 1$$

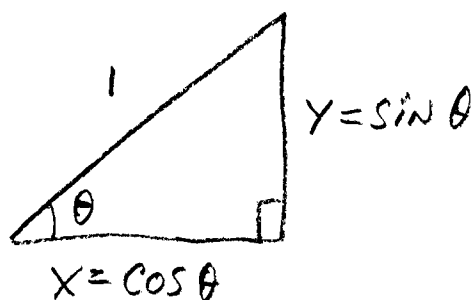
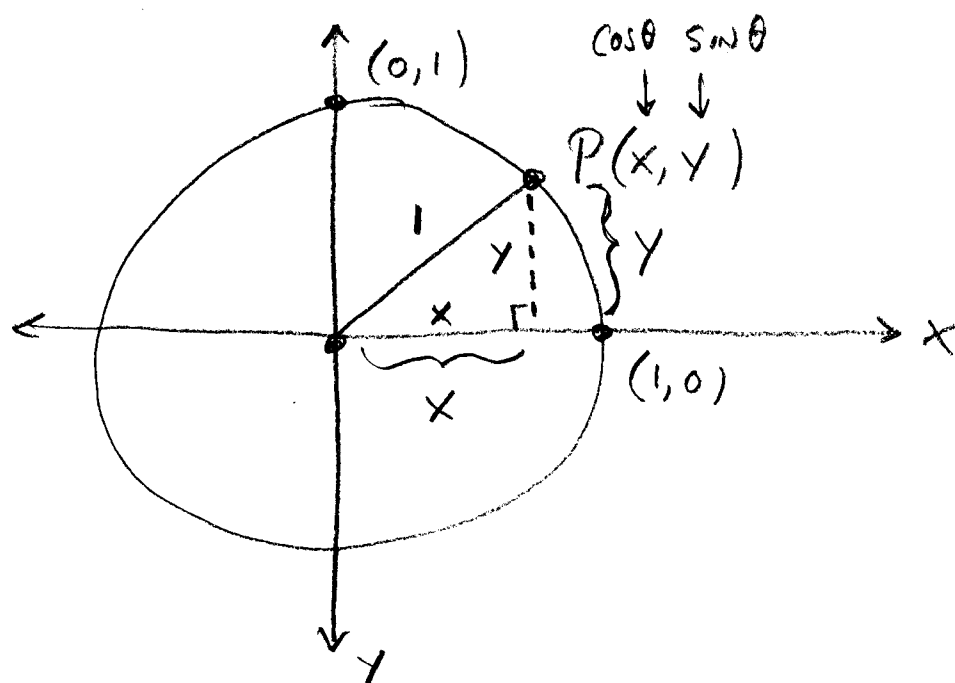
$$\frac{o^2 + a^2}{H^2} = 1$$

BUT
 $o^2 + a^2 = H^2$
by Pythagorean Theorem

$$\therefore \frac{H^2}{H^2} = 1 \checkmark$$

This is ONE of several trig. identities called the Pythagorean Identities

You can use the unit circle to show $\sin^2 \theta + \cos^2 \theta = 1$



Pythagorean Theorem $\Rightarrow \sin^2 \theta + \cos^2 \theta = 1^2 \checkmark$

Can you use the above $\triangle$ to see another very useful & common trig. identity?

$$\frac{\sin \theta}{\cos \theta} = ?$$

$$\boxed{\frac{\sin \theta}{\cos \theta} = \tan \theta}$$

$$\text{Also: } \frac{\frac{O}{H}}{\frac{A}{H}} = \frac{O}{H} \cdot \frac{H}{A} = \frac{O}{A} = \tan$$

(EX) Verify $\tan^2 \theta + 1 = \sec^2 \theta$

$$\tan^2 \theta + 1$$

$$\sec^2 \theta$$

$$\frac{\sin^2 \theta}{\cos^2 \theta} + 1$$

$$\frac{\sin^2 \theta}{\cos^2 \theta} + \frac{\cos^2 \theta}{\cos^2 \theta}$$

$$\frac{\sin^2 \theta + \cos^2 \theta}{\cos^2 \theta}$$

$$\frac{1}{\cos^2 \theta}$$

$$\sec^2 \theta$$

$$\sec^2 \theta \quad \checkmark$$

Tips for proving identities:

LEFT SIDE = RIGHT SIDE

- Work ONE SIDE AT A time, try to take the more complicated side and simplify it. If both sides are complicated, simplify both
- Try changing everything to SIN and COS
- Don't forget "common denominators"

Homework

Memorize: The Reciprocal Functions

The Reciprocal Identities

"The" Pythagorean Identity

Definition of Identity

$$\frac{\sin \theta}{\cos \theta} = ?$$

Meaning of $\sin^2 \theta$

Verify: $\cot^2 \theta + 1 = \csc^2 \theta$