Math 11: Unit 7 Trigonometry
Unit 7.1: Angles in Standard Position

A. Vocabulary

B. What does it mean for an angle to be in Standard Position?
   -it means angle θ has its vertex at the origin (in a coordinate system) and its initial arm is on the positive x-axis.

Ex:

C. What are 'coterminal angles'? -see WB pg 252

Ex: $\theta = 100^o$ is in standard position.
i) draw the angle in standard position.

ii) Find 2 positive coterminal angles when $\theta = 100^o$. Draw it in a coordinate system.

iii) Find 2 negative coterminal angles when $\theta = 100^o$. Draw it in a coordinate system.

Ex: Find the smallest positive coterminal angles for:

i) 2020^o							ii) -1982^o

D. What are 'reference angles'? - see WB pg 253

-note: reference angles are always positive and $0<\theta<90$

Ex: find the reference angles for:

i) ii) iii)

Ex: if $\Theta=135^{o}$, what is the reference angle? Sketch Θ in standard position and the reference angle also.

Ex: if $\theta = -150$, find the reference angle. Sketch both the angle in standard position and the reference angle.

Ex: find the reference angle for 1090^o and -500^o.

-do WB pg 257 #1abcd, 2abcd, 3abcd, 5abcd, 9abcd

Math 11: Unit 7.2: Trigonometric Ratios from any Angle

A. Remember the Pythagorean Theorem?

B. Remember SOH CAH TOA for right triangles?

C. We can combine both to find the trig ratios from any angle on a coordinate system.

-ex: what if: i)

ii)

iii)

iv)

-notice a pattern? We get CAST: tells us which trigonometric ratio will be positive in which quadrants.

-prob: in (ii)-(iv) we found the reference angle…but we want the *standard angle*!

Ex: find and draw cos θ =   , when $0<\theta<360^o$.

step 1: where is cos Θ negative?

step 2: find the reference angle

-make: cos θ= (make it positive, since reference angles are ALWAYS positive)

-so: cos ϴ=0.6 so ϴ = (means reference angle in each quadrant is 53°)

BUT standard angle for cos θ = is in quadrant II and III, so

step 3: these reference angles look like:

then our standard angles are

Ex: find and draw ϴ for sin ϴ= -0.5

-pg 266 #2: left, #3abcd, #5abcd, 6abcd

Math 11: Unit 7.3: Special Angles

A. What are the special angles in trigonometry?

-2 particular right triangles are considered 'significant' because of their frequent occurrence. We can also calculate their trig ratios exactly:

i) 45^o-45^o-90^o

ii) 30^o-60^o-90^o

B. How can we use these ratios and CAST to find standard and reference angles?

-see WB pg 275 and 276

…don't memorize!

WB: pg 278 #2-4, 6: left

Math 11: Unit 7.4: Oblique Triangles

A. What are oblique triangles?

-An *oblique* triangle is any triangle that does not have a right triangle. It could be an acute triangle (all three angles of the triangle are less than right angles) or it could be an obtuse triangle (one of the three angles is greater than a right angle).

-ex:

B. How do we solve them?

-There are 3 categories of oblique triangles that can be *solved* and whose names express what is known about the side lengths and angle measurement:

i) An **SAA** (or **ASA**) triangle is one where the length of one side is known together with the measures of an adjacent angle and an opposite angle.

Ex: given <A = 110^{o}, <B = 20^{o} and c = 10, find <C, and sides 'b' and 'a'

ii) An **SSS** triangle is one where the lengths of all three sides are known.

Ex: given a = 8, b=10, and c =12, find <A, <B and <C.

iii) An **SAS** triangle is one where the measure of an angle is known together with the lengths of an adjacent side and an opposite side (angle between 2 sides)

Ex: given <a = 30^{o}, b=10, and c =8, find side 'a', and angles <C and <B.

prob: what if **SSA** or **ASS** (angle is not contained between the 2 sides)?
ex: given <A=30^{o}, a=7 and b=16, find side 'c'.

…sometimes called the 'donkey theorem' because it can have more than 1 answer…and leads into the Ambiguous Case of the Sine Law (next day)

-WB pg 287 #3, 4

Math 11: Unit 7.5: Trigonometry with Triangles Without 90°

A. Examples of Sine Law questions (ignore Ambiguous Case of Sine Law)

B. Examples of Cosine Law questions

-pg 295 #5-6 (left)
-pg 303 #3, 7(left), 8 (left)
-review, test