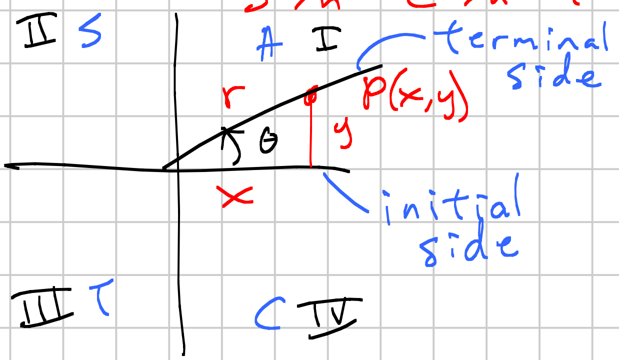
PreCalc 11 Final Review Chp 6

Note Title 2016-05-25

6.1) Angles in Standard Position in Q I

S $^o/_h$ C $^a/_h$ T $^o/_a$ ⇒ S $^y/_r$ C $^x/_r$ T $^y/_x$ = slope.



+'ve angle is ccw.
Use Pythagorus to determine missing side

$r = \sqrt{x^2+y^2}$ $x = \sqrt{r^2-y^2}$ $y = \sqrt{r^2-x^2}$

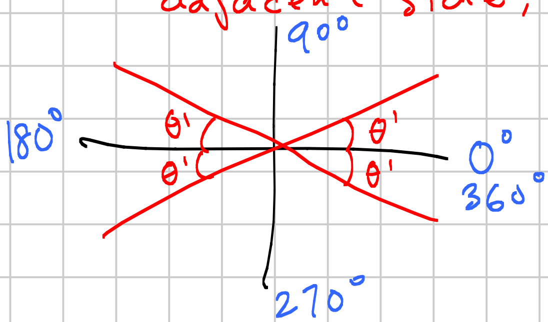
Determine sign of x & y using ASTC or quadrant.
'r' is always positive.

For unit circle (r = 1):
$y = \sin\theta$
$x = \cos\theta$

For non-unit circle:
$y = r\sin\theta$
$x = r\cos\theta$

6.2) Angles in Standard Position in All Quads.

Reference angle is measured from x-axis to the terminal side and is positive. This makes the adjacent side, the x-axis, so standard position works.



Reference angle: $0° \le \theta' \le 90°$
(use prime notation ')

I:	$\theta = \theta'$	$\theta' = \theta$
II:	$\theta = 180° - \theta'$	$\theta' = 180° - \theta$
III:	$\theta = 180° + \theta'$	$\theta' = \theta - 180°$
IV:	$\theta = 360° - \theta'$	$\theta' = 360° - \theta$

Special Angles:

Ref Angle	$\sin\theta$	$\cos\theta$	$\tan\theta$
0°	0	1	0
30°	$1/2$	$\sqrt{3}/2$	$1/\sqrt{3}$
45°	$1/\sqrt{2}$	$1/\sqrt{2}$	1
60°	$\sqrt{3}/2$	$1/2$	$\sqrt{3}$
90°	1	0	undef.

Inverse Trig – do on |ratio|, gives ref angle θ', then determine quad and calc θ.

eg) $\cos\theta = -\frac{1}{2}$

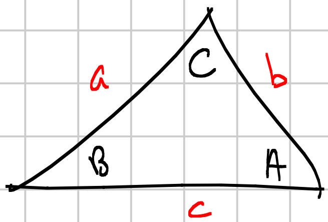
$\theta' = \cos^{-1}\left(\left|-\frac{1}{2}\right|\right) = 60^\circ$

cos is negative in Q II & III

II: $\theta = 180^\circ - 60^\circ = 120^\circ$

III: $\theta = 180^\circ + 60^\circ = 240^\circ$

6.4) Sine Law:



$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Put unknown variable in the numerator so that algebra is easier.

Case ASA: No checks, b/c not ambiguous.

After calculating 2^{nd} angle, use triangle 180° property:

$A + B + C = 180^\circ$

Case ASS: Alternate method:

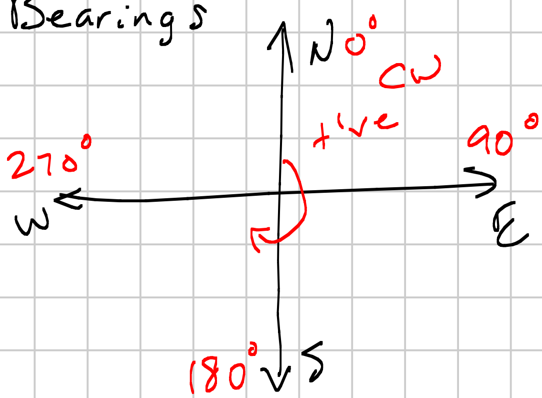
$a/c < \sin A$ – not a triangle.

$\sin A < a/c < 1$ – 2 triangles – ambiguous case.

$a/c \geq 1$ – 1 triangle.

With 2 triangles (ambiguous), the 2^{nd} triangle is found by using the Q II formula: other $C = 180^\circ - C$

Bearings



Alternate Bearing

dir → change → to dir

eg) N 20° E = $0^\circ + 20^\circ = 20^\circ$

E 30° N = $90^\circ - 30^\circ = 60^\circ$

S 15° W = $180^\circ + 15^\circ = 195^\circ$

Bearings

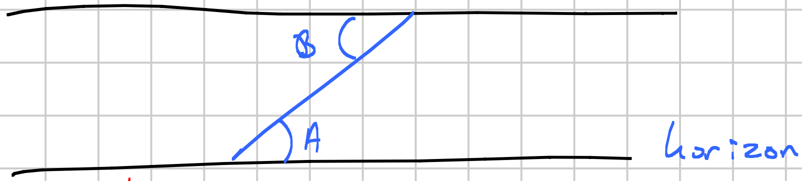
6.5) Cosine Law: – no ambiguous case

– use for SAS or SSS

$c^2 = a^2 + b^2 - 2ab\cos C$

– only need to use once, then go with Sine Law & triangle property.

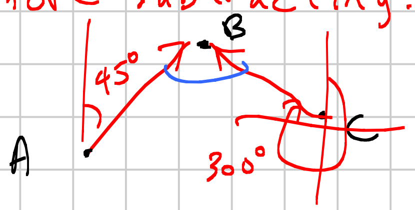
Definitions - Angle of Elevation (A), Angle of Depression (B)
inclination declination.



A & B are with respect to horizon.

When subtracting angles, make sure that you are using directions pointing away from the vertex. Reverse directions by adding/subtracting 180° (keep angles 0°-359°)
If angle crosses 360°, add 360° to smaller direction before subtracting.

eg)



$B \to A = 45° + 180° = 225°$

$B \to C = 300° - 180° = 120°$

$\angle B = 225° - 120° = 105°$