Trig 6.1 Angles 1/10/2005

1. Degree measure
2. Coterminal angle
3. Radian measure
4. ★ Converting Degree & Radian Measures
5. ★ Formula for length and area of an arc

on all exams

1. Degree Measure

① terminal side, amount of rotation, initial side

complete rotation 360°

180°

90°

② + positive (counter clockwise rotation)

- negative (clockwise rotation)

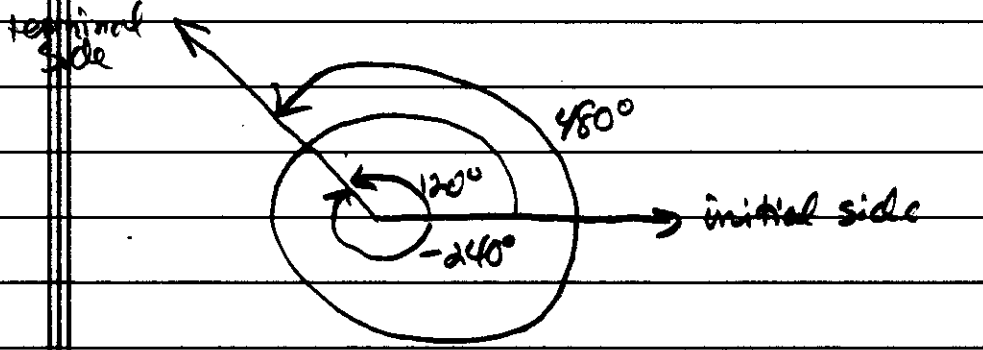
③ Complementary angle - $\alpha + \beta = 90°$ α is complementary angle of β

β is complementary angle of α

Supplementary angle - $\alpha + \beta = 180°$ α is supplementary angle of β

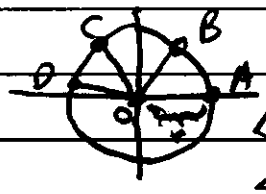
β is supplementary angle of α

2. Coterminal angle - common initial side & terminal side



Trig 6.1 cont.

3. **Radian Measure**



$\overset{\frown}{AB}$ = 1 radian
$\angle AOC$ = 2 radians
$\angle AOD$ = 3 radians

6.28 radians = 360° = 2π
360° = 2π 180° = π

4. **Convert between Degree & Radian**

① Convert from degrees to radian
150° = ? radians $150° \cdot \frac{\pi}{180°} = \frac{5}{6}\pi$
120° = ? radians $120° \cdot \frac{\pi}{180°} = \frac{2}{3}\pi$

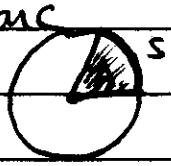
② Convert from radian to degree
$\frac{\pi}{4}$ = ? degrees $\frac{\pi}{4} \cdot \frac{180°}{\pi} = \frac{90°}{2} = 45°$

5. **Formula for Length and area of an arc**

Let s = length of arc Let A = area of arc

$s = r \cdot \theta$
$A = \frac{1}{2} r^2 \cdot \theta$

θ is always radian, never use degrees!



Ex. Given θ = 45° r = 8 find s & A

Sol $s = r \cdot \theta$
$s = 8 \cdot \frac{\pi}{4} = 2\pi$
$A = \frac{1}{2} r^2 \cdot \theta$
$A = \frac{1}{2} 8^2 \cdot \frac{\pi}{4} = 8\pi$

$45° \cdot \frac{\pi}{180°} = \frac{\pi}{4}$

Ex Given θ = 45° diameter = 16 find s & A

$s = r \cdot \theta$
$s = 8 \cdot \frac{\pi}{4} = 2\pi$
$A = \frac{1}{2} 8^2 \cdot \frac{\pi}{4} = 8\pi$

$d = 16 \Rightarrow r = 8$
$\theta = 45° \cdot \frac{\pi}{180°} = \frac{\pi}{4}$