Now: online HW accessible to all   ①

↓

see the email I sent
Saturday

TRIG — open in-class attendance up

Webwork — on campus — NO CHANGE

virtually — cloud.fairmontstate.edu

~~HTML~~ "HTML"

login w/ usual UCA/PW

WeBWork — https://csmath.faim—

username : UCA

pw   : UCA

TRigonometry

ray

$52°$

infinite line w/ starting pt

Angles – An angle is two <u>rays</u> whose start points are the same.

<u>Standard position</u> – put common pt of angle at $(0,0)$ in plane and one of the rays lying on the positive x-axis

"terminal side"

"initial side"
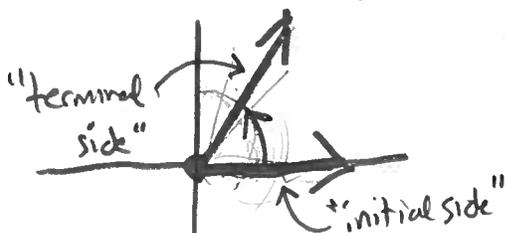
can think: "movement" defining an angle

<u>Degree measurement</u>

"1 revolution" ~ describes the angle
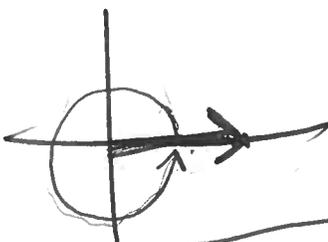
degree measure: $\boxed{\underline{1} \text{ revolution} = 360°}$

goes back to Babylon

div by 2

$\boxed{\frac{1}{2} \text{ rev} = \frac{360°}{2} = 180°}$

$\boxed{\frac{1}{4} \text{ rev} = \frac{360°}{4} = 90°}$

$\boxed{\frac{3}{4} \text{ rev} = 270°}$

$180°$

$90°$
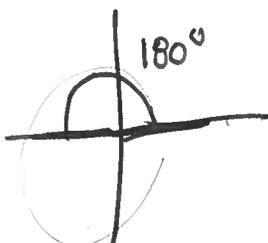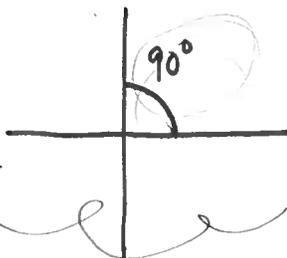
$270°$
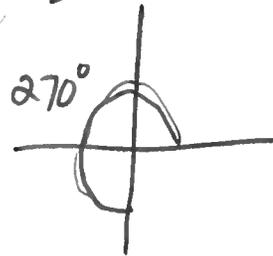
Radian measure

$\pi \approx 3.14159\ldots$

$$\underline{1} \text{ revolution} = 2\pi \text{ rad}$$

circumf $= 2\pi R$

$R = 1$
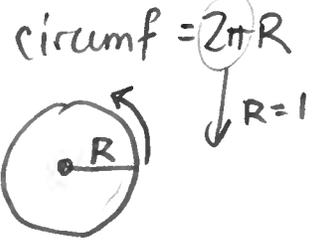
$$\frac{1}{2} \text{rev} = \pi \text{ rad}$$

$$\frac{1}{4} \text{rev} = \frac{\pi}{2} \text{ rad}$$

$$\frac{3}{4} \text{rev} = \frac{3\pi}{2} \text{ rad}$$

w/o rad

$$\frac{d}{dx} \sin x = \cos x$$

Translate b/w deg + rad

$$2\pi \text{ rad} = \underline{1} \text{ revolution} = 360°$$

$$1 = \frac{360°}{2\pi \text{ rad}}$$

$$1 = \frac{180°}{\pi \text{ rad}}$$

div by 2π rad

$$2\pi \text{ rad} = 360°$$

div by 360°

$$\frac{2\pi \text{ rad}}{360°} = 1$$

$$\frac{\pi \text{ rad}}{180°} = 1$$

Ex: Write $12°$ in terms of rad.

Soln:

120°
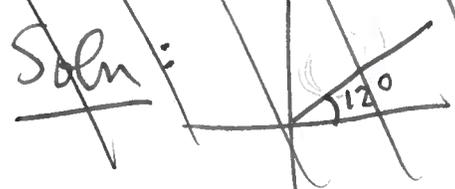
Convert

Ex: 3 min into seconds

$$\frac{x^2 y}{x} = xy$$

Soln: $3 \min = (3 \min)(1)$

1 min = 60 sec

$$1 = \frac{60 \sec}{1 \min}$$

$$= (3 \min)\left(\frac{60 \sec}{1 \min}\right)$$

$$= 3(60) \sec = \boxed{180 \sec}$$

Ex: Convert $12°$ into rad.

Soln: $12° = (12°)(1) = (12°)\left(\dfrac{\pi\, rad}{180°}\right)$

$\left(\pi \sim pi\right)$

$\sqrt{2} \sim sqrt(2)$

$= \dfrac{12\pi}{180}\, rad = \dfrac{6\pi}{90}\, rad = \dfrac{2\pi}{30}\, rad$

$= \dfrac{\pi}{15}\, rad$

Ex: Convert $\dfrac{\pi}{9}\, rad$ into degrees

Soln: $\dfrac{\pi}{9}\, rad = \left(\dfrac{\pi}{9}\, rad\right)(1)$

$= \left(\dfrac{\pi}{9}\, rad\right)\left(\dfrac{180°}{\pi\, rad}\right)$

$= \left(\dfrac{180}{9}\right)° = 20°$

Ex: Convert $2\, rad$ into degrees.

Soln: $(2\, rad) = (2\, rad)(1)$

$= (2\, rad)\left(\dfrac{180°}{\pi\, rad}\right)$

$= \left(\dfrac{360}{\pi}\right)°$

EX: A searchlight does

   1 revolution every 3 seconds

How long does it take for the searchlight
to rotate (180°)?

Soln:
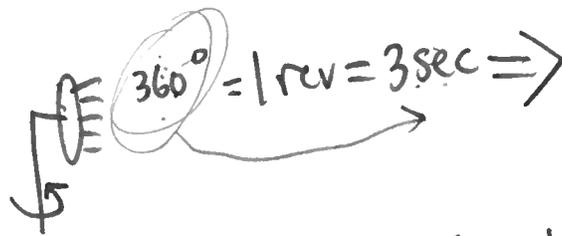
$360° = 1 \text{ rev} = 3 \text{ sec} \implies \frac{3 \text{sec}}{360°} = 1$

$$\boxed{\frac{1 \text{sec}}{120°} = 1}$$

Goal: convert 180° into seconds

$180° = (180°)(1)$

$= (180°)\left(\frac{1\text{sec}}{120°}\right) = \frac{180}{120} \text{ sec}$

$= \frac{18}{12} \text{ sec}$

$= \frac{9}{6} \text{ sec}$

$= \frac{3}{2} \text{ sec}$

Pythagorean theorem

only applies to right-Δ's

Sum of angles of
FACT: a triangle
is 180°

Only applies
in plane

90° angle

Earth

N

270°