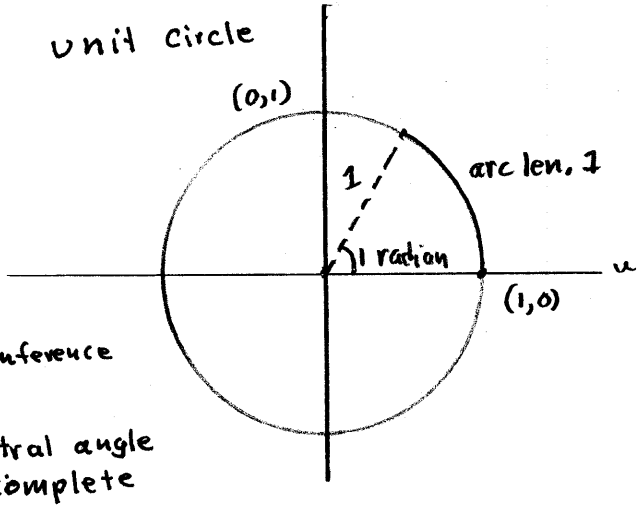
These are almost my final notes

RADIAN

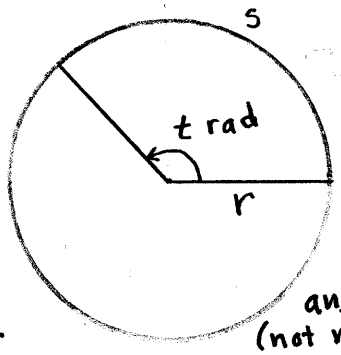
unit circle



one circumference is 2π.
The central angle of the complete circle is 2π.

DEF
one radian is the angle corresponding to an arc length of 1 on the unit circle.

Then the angle corresponding to an arc length of one circumference ($2\pi \cdot 1$) is 2π (also 360°).



any circle (not nec. unit circle)

The arc length cut off on a circle of radius r by a central angle of t radians satisfies } any circle

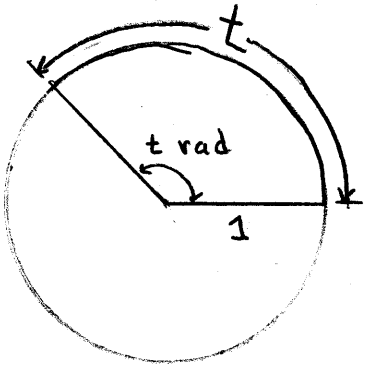
$$\frac{s}{2\pi r} = \frac{t}{2\pi \cdot 1}$$ } NOTE at LEFT

(any circle, unit circle)

$$\Leftrightarrow \boxed{s = rt}$$ any circle

The fraction of the total circumference $2\pi r$ corresp to angle t is the same as the fraction of the unit circle corresp to the same angle t.

unit circle



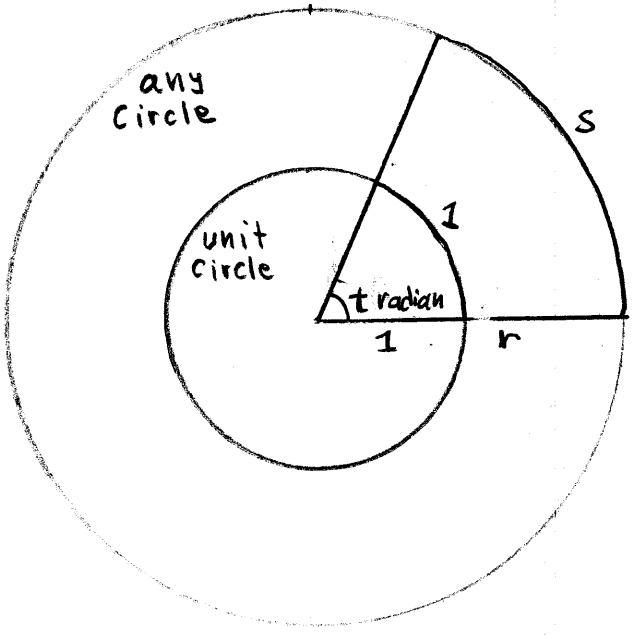
when $r = 1$

$s = t$, unit circle

This means that the length of arc on the unit circle cut off by a central angle of t radians is t.

These are my final notes

RADIAN



DEF

one radian is the angle corresponding to an arc length equal to the radius.

1 radian = angle corresp arc r
2 radian = " " 2r
3 radian = " " 3r
2π radian = " " 2πr

Any circle: The angle corresponding to an arc length of one circumference ($2\pi r$) is 2π.

s is the arc length corresponding to a central angle t.

The ratio of arc length : circumference of any circle equals the ratio of angle corresp to that arc : angle of full circle. That is,

Arc lens / Angles

$$\frac{s}{2\pi r} = \frac{t}{2\pi}$$

$$\equiv \quad \frac{s}{r} = t$$

$$\equiv \quad \boxed{s = rt \text{ , any circle} \qquad s = t \text{ , unit circle}}$$

* This is true ONLY when angle in radians.

Angle of full circle $\frac{2\pi \text{ rad}}{360^\circ}$

So $2\pi = 360^\circ$

$\boxed{\pi = 180^\circ}$ conversion factor

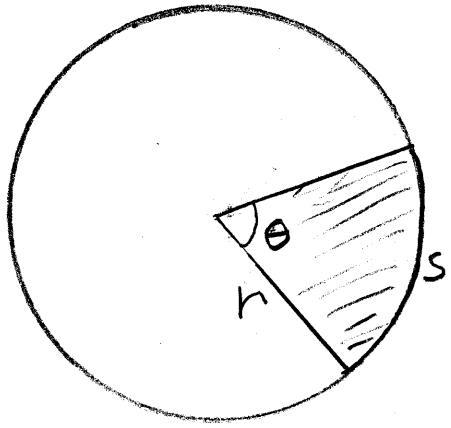
And $1 \text{ rad} = \frac{180^\circ}{\pi} \approx 57^\circ$

[EX] convert $\frac{\pi}{3}$ to degrees.

$$\frac{\pi}{3}\left(\frac{180^\circ}{\pi}\right) = \frac{180^\circ}{3} = 60^\circ$$

[EX] convert 45° to radians

$$45^\circ\left(\frac{\pi \text{ rad}}{180^\circ}\right) = \frac{45}{180}\pi = \frac{\pi}{4} \text{ rad}$$



a <u>sector</u> of
a circle radius r
angle θ

Get formula for Area sector

$$\frac{s}{2\pi} = \frac{A}{\pi r^2}$$

$$s = r\theta$$

$$\Rightarrow \quad \frac{r\theta}{2\pi} = \frac{A}{\pi r^2}$$

$$\Leftrightarrow \quad A = \frac{1}{2} r^2 \theta$$ true only for θ in radians.