<u>Section 5.1 Angles and Their Measures</u>

terminal side

θ

initial side

vertex

counter clockwise
positive angle measure

β

clockwise
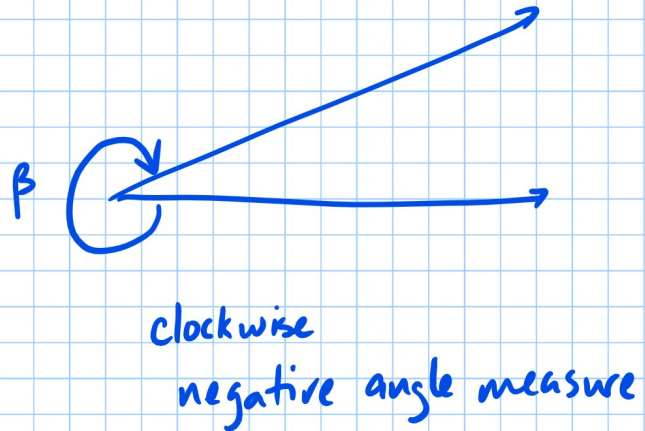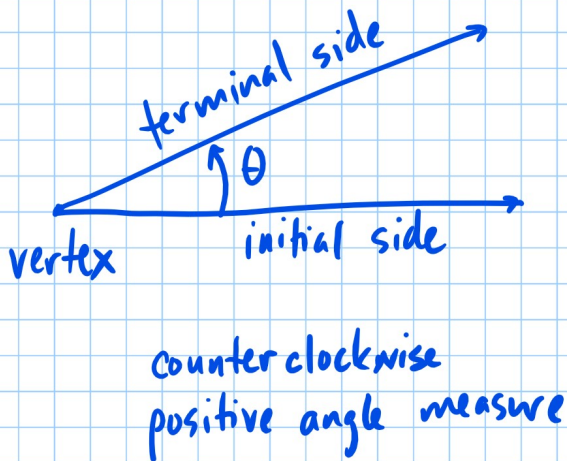negative angle measure

<u>Standard position</u> - initial side is positive x-axis
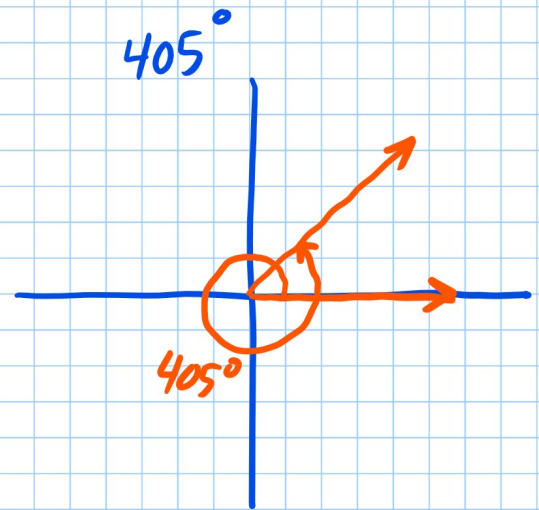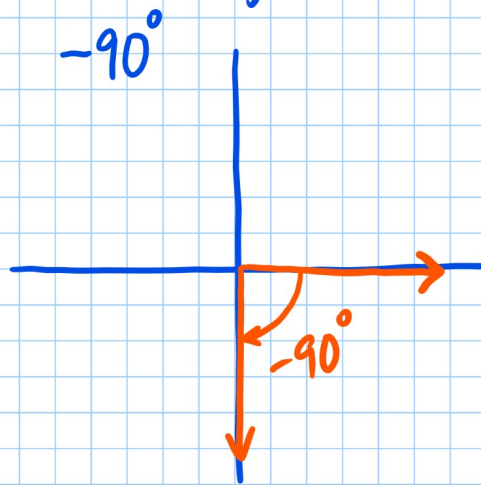

terminal

θ

I

II

initial

III

IV

We say θ lies in Quadrant
II because that's where
the terminal side is.

When the terminal side lies on an axis we say the
angle is a <u>quadrantal angle</u>.

One way to measure angles is <u>degrees</u>. There are $360°$
in one revolution. A <u>straight angle</u> measures $180°$.
A <u>right angle</u> measures $90°$.

ex: Draw angle in standard position

-90°

-90°

405°

405°

To get measures more precisely we use _minutes_ and _seconds_

ex: $50° \, 6' \, 21''$

degrees, minutes, seconds

60 minutes in 1 degree
60 seconds in 1 minutes
3600 seconds in 1 degree

Convert to decimal

$50° \, 6' \, 21'' = 50.106°$

50 2nd angle ° 6 2nd angle ' 21 '' enter
↑
above
+

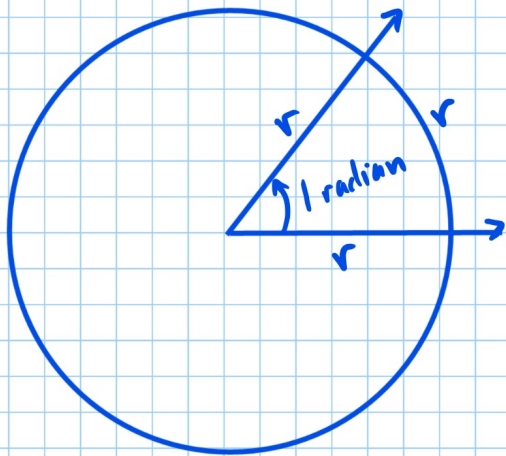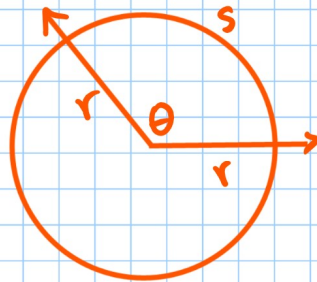Convert to degrees, minutes, seconds

$21.256° = 21° \, 15' \, 21.6''$

21.256 2nd angle ►DMS enter

►DMS

A central angle is one whose vertex is the center of a circle. We can measure angles in radians

If the radius of the circle and the arc length are the same the angle measures 1 radian.

s = arc length

$$s = r\theta$$

For this formula, θ must be in radians

What is angle in radians that is 1 revolution?

one revolution has arc length = circumference

$$r\theta = 2\pi r$$

$$\theta = 2\pi \text{ radians}$$

$$360° = 2\pi \text{ radians}$$

$$1° = \frac{\pi}{180} \text{ radians}$$

$$1 \text{ radian} = \frac{180}{\pi} \text{ degrees}$$

To convert from degrees to radians multiply by $\frac{\pi}{180}$

To convert from radians to degrees, multiply by $\frac{180}{\pi}$

ex: Convert $315°$ to radians

$$315 \cdot \frac{\pi}{180} = \boxed{\frac{7\pi}{4}}$$

$315 \times 1/180$ ▶ FRAC enter $= \frac{7}{4}$

ex: Convert $\frac{5\pi}{6}$ to degrees

$$\frac{5\cancel{\pi}}{\cancel{6}} \cdot \frac{\overset{30}{\cancel{180}}}{\cancel{\pi}} = 150°$$

p379 5-40 multiples of 5, 69, 70, 75, 76

40) $\theta = \frac{1}{4}$ radian $S = r\theta$

$$4 \cdot 6 = r \cdot \frac{1}{4} \cdot \cancel{4}$$

$S = 6$ cm

$$24 \text{ cm} = r$$