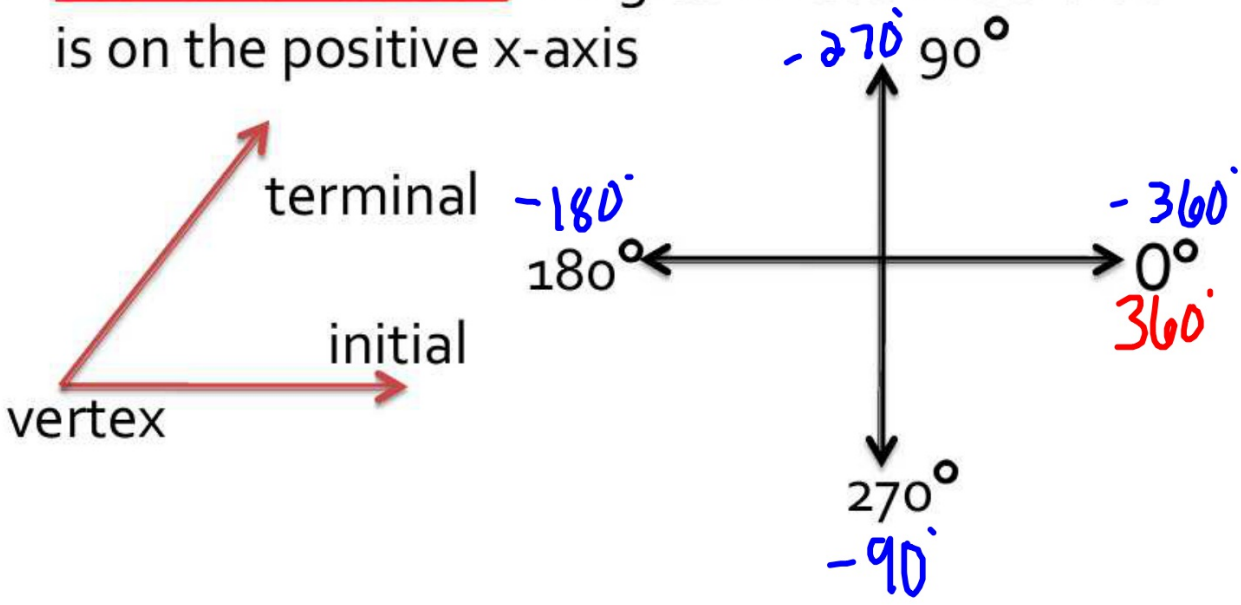
Section 4.1

Radian and Degree Measure

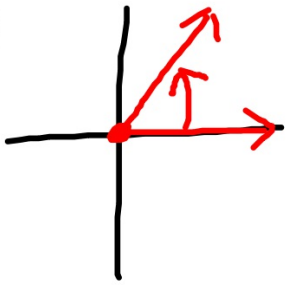
Angles

- Trigonometry: the measurement of angles
- Standard Position: Angles whose initial side is on the positive x-axis

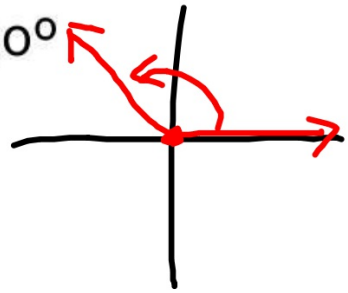


Graphing positive angles

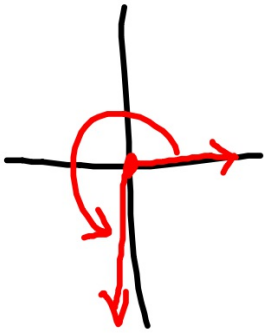
1.) 50°



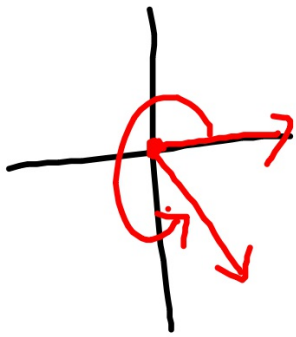
2.) 130°



3.) 260°



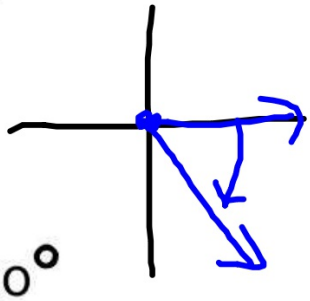
4.) 310°



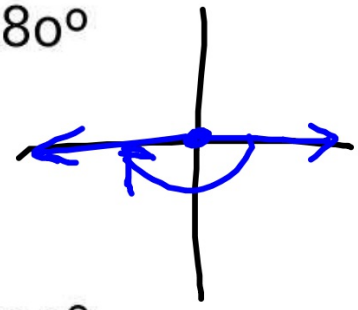
Graphing Negative angles

(go back to graph and write in)

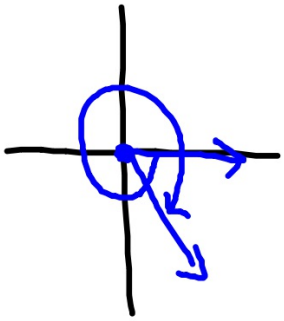
1.) -50°



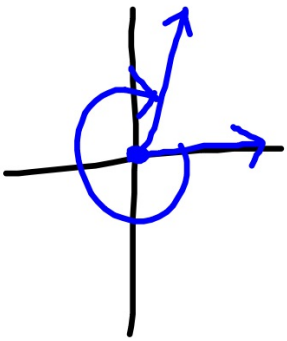
2.) -180°



3.) -420°



4.) -300°



Coterminal angles

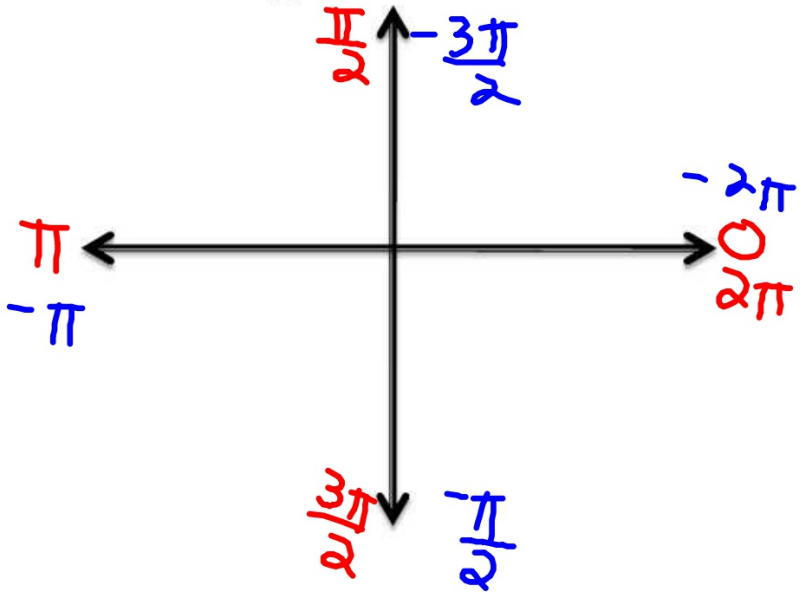
- Angles that share the same terminal side
- Differ by 360° (or a multiple of 360 ie. 720)
- Example 4 vs example 1
- To find positive and negative coterminal angles- add and subtract 360°
- 1.) 210° 2.)-180° 3.) 400°

570° 180° 40°

-150° -540° -320°

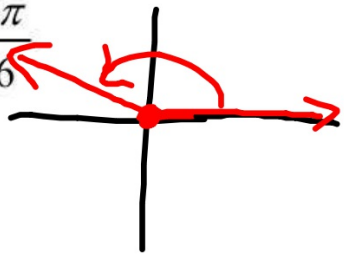
Radian Measure

- Radians are a 2nd way to measure an angle
- Positive and negative radian measures:

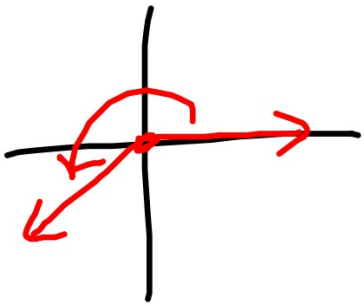


Graphing positive angles

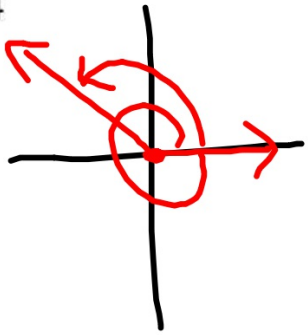
1.) $\frac{5\pi}{6}$



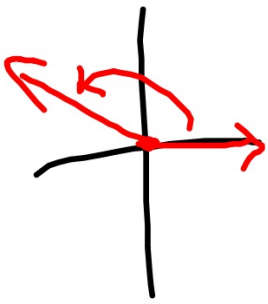
2.) $\frac{6\pi}{5}$



3.) $\frac{11\pi}{4}$

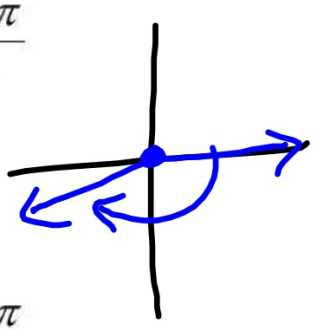


4.) 2.5

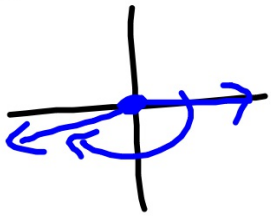


Graphing negative angles

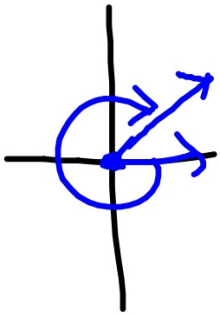
1.) $\frac{-5\pi}{6}$



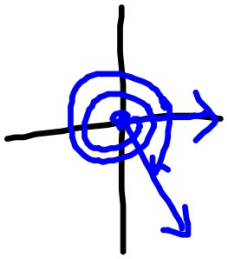
2.) -3



3.) $\frac{-9\pi}{5}$



4.) $\frac{-13\pi}{3}$



Coterminal angle with radians

- Differ by 2π
- To find a positive and negative coterminal angle, add and subtract 2π

1.) 3π

$5\pi, \pi$

$-\pi$

2.) $\frac{3\pi}{4} \pm 2\pi$

$\frac{3\pi}{4} \pm \frac{8\pi}{4}$

$\frac{11\pi}{4}, \frac{-5\pi}{4}$

3.) $\frac{-5\pi}{6} \pm 2\pi$

$\frac{-5\pi}{6} \pm \frac{12\pi}{6}$

$\frac{7\pi}{6}, \frac{-17\pi}{6}$

Conversions

- Degree to radian: Multiply by $\frac{\pi}{180}$

1.) $60^\circ \cdot \frac{\pi}{180} = \frac{\pi}{3}$ 2.) $-150^\circ \cdot \frac{\pi}{180} = -\frac{5\pi}{6}$ 3.) $540^\circ \cdot \frac{\pi}{180} = 3\pi$

- Radian to degree: Multiply by $\frac{180}{\pi}$

1.) $-\frac{\pi}{6} \cdot \frac{180^\circ}{\pi}$ -30° 2.) $\frac{7\pi}{4} \cdot \frac{180^\circ}{\pi}$ 315° 3.) $\frac{15\pi}{7} \cdot \frac{180^\circ}{\pi}$ 385°

Special angles

- Complementary angles- angles whose sum = 90
- Supplementary angles- angles whose sum = 180

1.) 45° 2.) 61° 3.) 100° 4.) $\frac{5\pi}{6}$

C: 45°
S: 135°

C: 29°
S: 119°

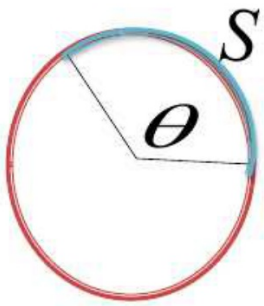
C: none
S: 80°

C: none
S: π/6

Arc Length

- Arc length- measures a segment (arc) of a circle

$$S = r\theta$$



- θ must be in radians

- 1.) $r = 5, \theta = \frac{3\pi}{4}$

$S = 5 \cdot \left(\frac{3\pi}{4}\right) = \frac{15\pi}{4}$

2.) $r = 3, \theta = \frac{4\pi}{5}$

$S = 3 \cdot \left(\frac{4\pi}{5}\right) = \frac{12\pi}{5}$

Area of a sector

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

$120^\circ \cdot \frac{\pi}{180} = \frac{2\pi}{3}$

1.) $r = 3, \theta = \frac{2\pi}{3}$

$A = \frac{1}{2} \cdot 3^2 \cdot \frac{2\pi}{3}$

$A = \frac{18\pi}{6} = 3\pi u^2$

2.) $r = 2, \theta = 120^\circ$

$A = \frac{1}{2} \cdot 2^2 \cdot \frac{2\pi}{3}$

$A = \frac{8\pi}{6} = \frac{4\pi}{3} u^2$

Classwork

- Pg 291 # 71-78

Homework

- Pg 290-91 # 8,10, 12-19, 21, 35-40, 43, 49-52, 80, 82, 87, 88, 91, 92