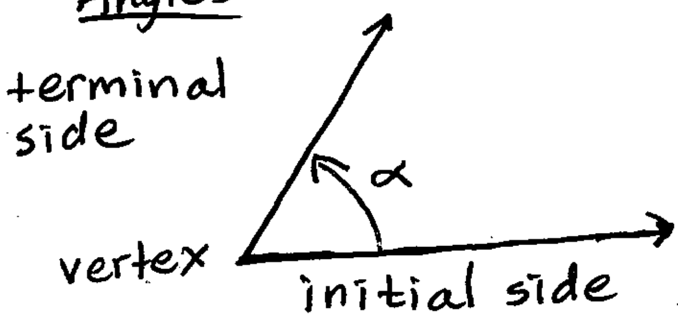
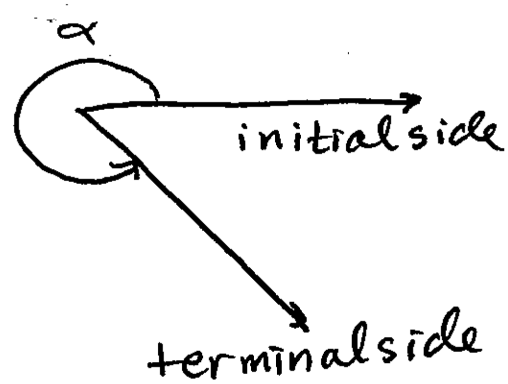
Chapter 5: The Trigonometric Functions

§5.1 Angles and Their Measurements

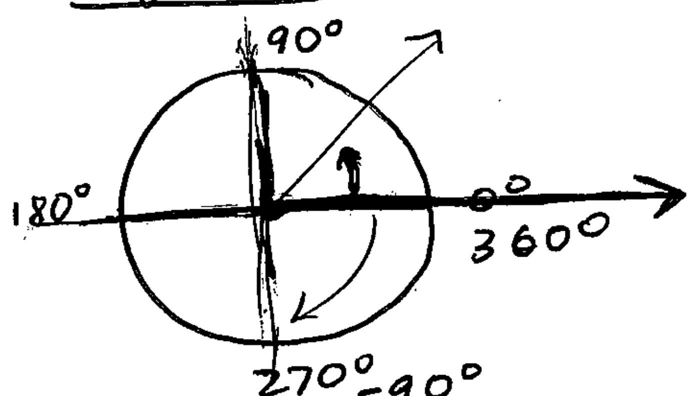
HW §5.1 #1-97 odd

Angles

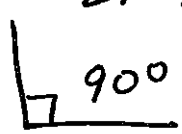


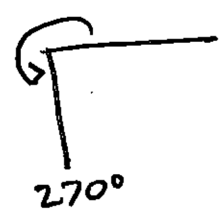


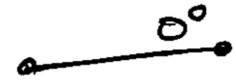
Degrees



There are 360° in a circle

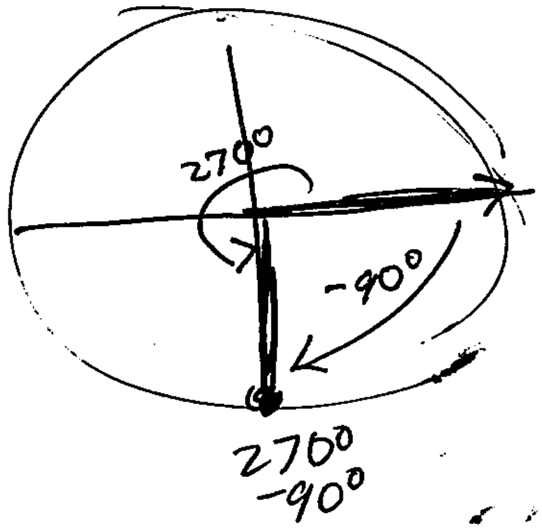






We measure positive angles in a counter-clockwise direction. Negative angles are measuring in a clockwise direction.

Coterminal Angles have the same position on the circle.



The difference of ~~two~~ coterminal angles is a multiple of 360°.

$$m\angle A = m\angle B + 360^\circ K$$

for some integer K

iff $\angle A$ and $\angle B$ are coterminal.

EXAMPLE Determine whethere the two angles are coterminal.

① $m\angle A = 190^\circ$, $m\angle B = -170^\circ$

SOLUTION $m\angle A - m\angle B$

$= 190^\circ - (-170^\circ)$

$= 190^\circ + 170^\circ = 360^\circ$

yes

② $m\angle A = 73^\circ$, $m\angle B = 1{,}873^\circ$

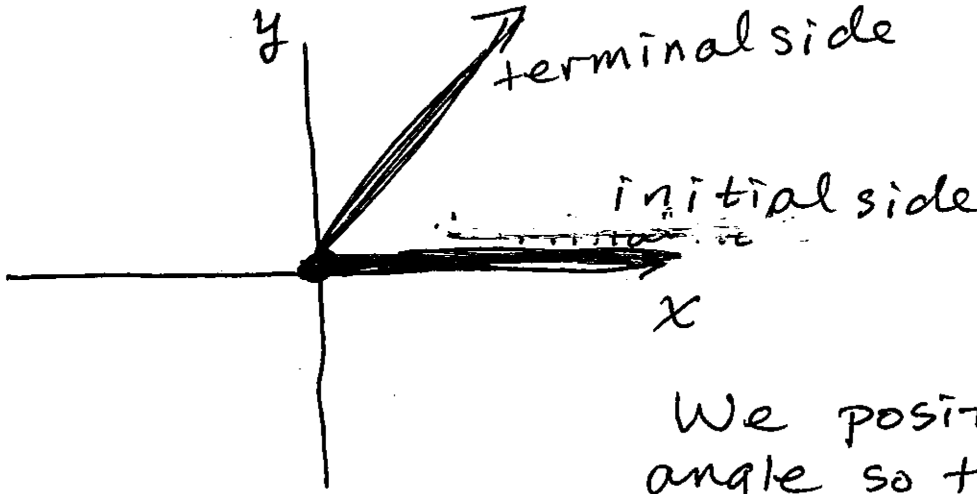
SOLUTION: $m\angle B - m\angle A$

$1873 - 73 = 1800$

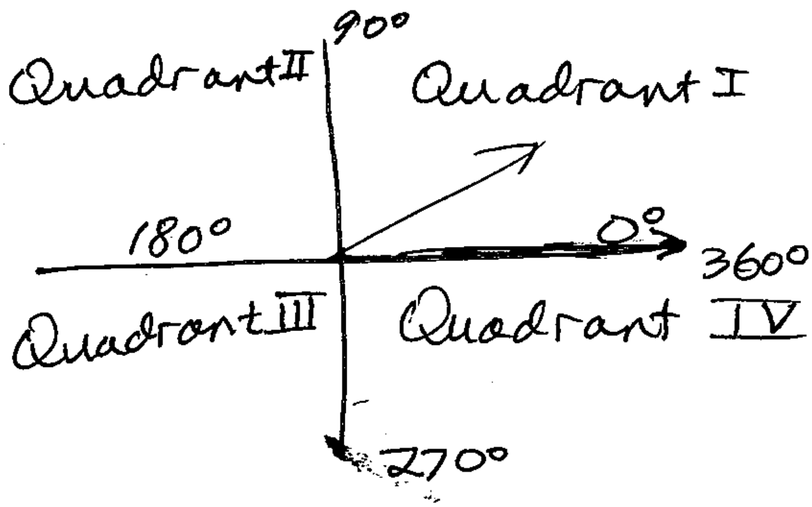
$= 5 \cdot 360^\circ$

yes

$360 \overline{)1800}$ = 5 r. 0

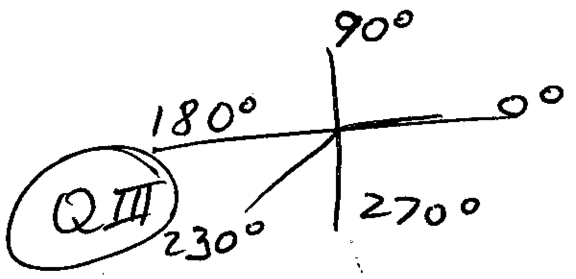


We position an angle so that the initial side lies along the positive X-axis. The vertex is at the orgin. This is called standard position.



EXAMPLE Determine the quadrant in which the angle lies.

~~a) 230°~~ a) $230°$



Answer: Q III

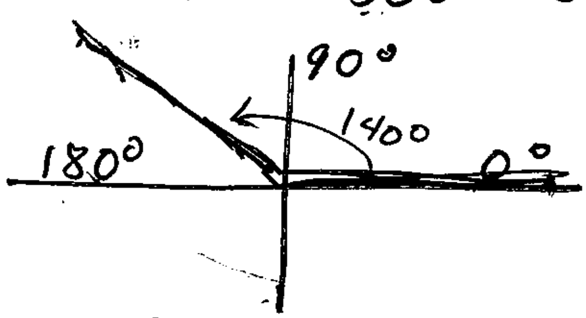
b) $-580°$

- We can add or subtract multiples of 360° until we find a coterminal angle between 0° and 360°.

$-580° + 360° = -220$

$-580° + 360° + 360° = 140°$

140°
-580°
Q II



Answer: Q II

or

$$360\overline{)580°}\quad 1 \text{ r. } 220°$$
$$\begin{array}{r} 580° \\ 360 \\ \hline 220 \end{array}$$

$-580°$ is cot. to $-220°$ cot. to

$-220 + 360 = 140$

Degrees- Minutes- Seconds

1 degree = 60 minutes

$1^\circ = 60'$

1 minute = 60second

$1' = 60''$

<u>EXAMPLE</u> Convert $44^\circ 12' 30''$ to decimal degrees.

<u>SOLUTION</u>

$44^\circ + 12' + 30''$

$= 44^\circ + 12 \cancel{min} \cdot \frac{1\ deg}{60\ \cancel{min}} + 30 \cancel{sec} \frac{1\ \cancel{min}}{60 \cancel{sec}} \cdot \frac{1\ de}{60\ m}$

$= 44^\circ + \frac{12}{60}^\circ + \frac{30}{(60)(60)}^\circ$

$= 44.2083^\circ$

§ 3.6 # 47 $\quad f(x) = \dfrac{2x^2+8x+2}{x^2+2x+1}$

$$= \frac{2(x^2+4x+1)}{(x+1)^2}$$

a) <u>zeros</u> $\quad 2x^2+8x+2=0$

$$2(x^2+4x+1)=0$$

$$x = \frac{-4 \pm \sqrt{4^2-4\cdot1\cdot1}}{2\cdot1} = \frac{-4 \pm \sqrt{16-4}}{2}$$

$$= \frac{-4 \pm \sqrt{12}}{2}$$

$$= \frac{-4 \pm \sqrt{4\cdot3}}{2}$$

$$= \frac{-4 \pm 2\sqrt{3}}{2}$$

$$x = -2 \pm \sqrt{3}$$

$x \approx -0.26, \ x = -3.7$

b) Vertical Asympt.

$$x^2+2x+1=0$$

$$(x+1)^2=0$$

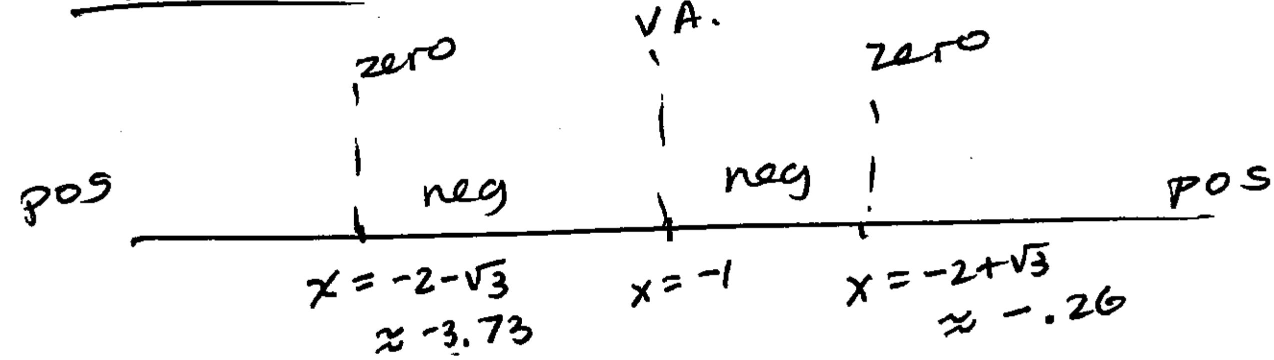
the line $x=-1$

c) Horiz Asympt. $\quad$ deg num = deg denom

$$y = \frac{\text{lead coeff num}}{\text{lead coeff denom}} = \frac{2}{1}$$

The line $y=2$

d) <u>Sign chart</u>



x	y
-10	$\frac{2(-10)^2+8(-10)+2}{(-10)^2+2(-10)+1}$ pos
-2	$\frac{2(-2)^2+8(-2)+2}{(-2+1)^2}$ = neg
-.5	neg
0	2 pos