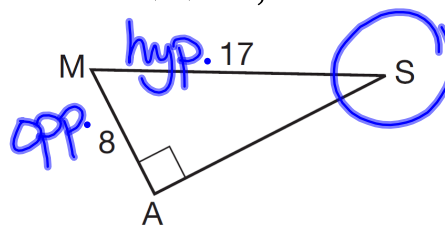


WARM UP:

IN THE RIGHT TRIANGLE SHOWN BELOW,
WHAT IS THE MEASURE OF ANGLE S, TO
THE NEAREST DEGREE?



SOH CAHTOA

~~sin~~ $\sin S = \frac{8}{17}$

$\sin^{-1}(8/17)$
28.07248694



$S = 28^\circ$

POP QUIZ!

Put everything away except calculators and pens

You have 5 minutes. GO!



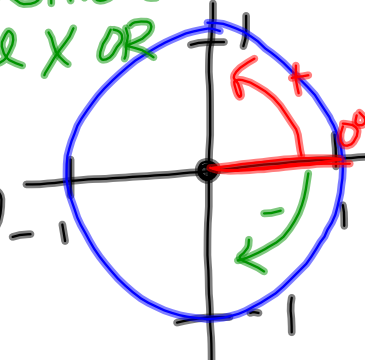
Unit Circle and Angles



unit circle- Circle w/ Radius = 1
 Centered @ (0,0) (eq: $x^2 + y^2 = 1$)

quadrantal angle- \angle in standard position
 whose terminal ray lies on the x or

standard position- \angle w/ its initial ray @ 0°
 (pos. side of x-axis)

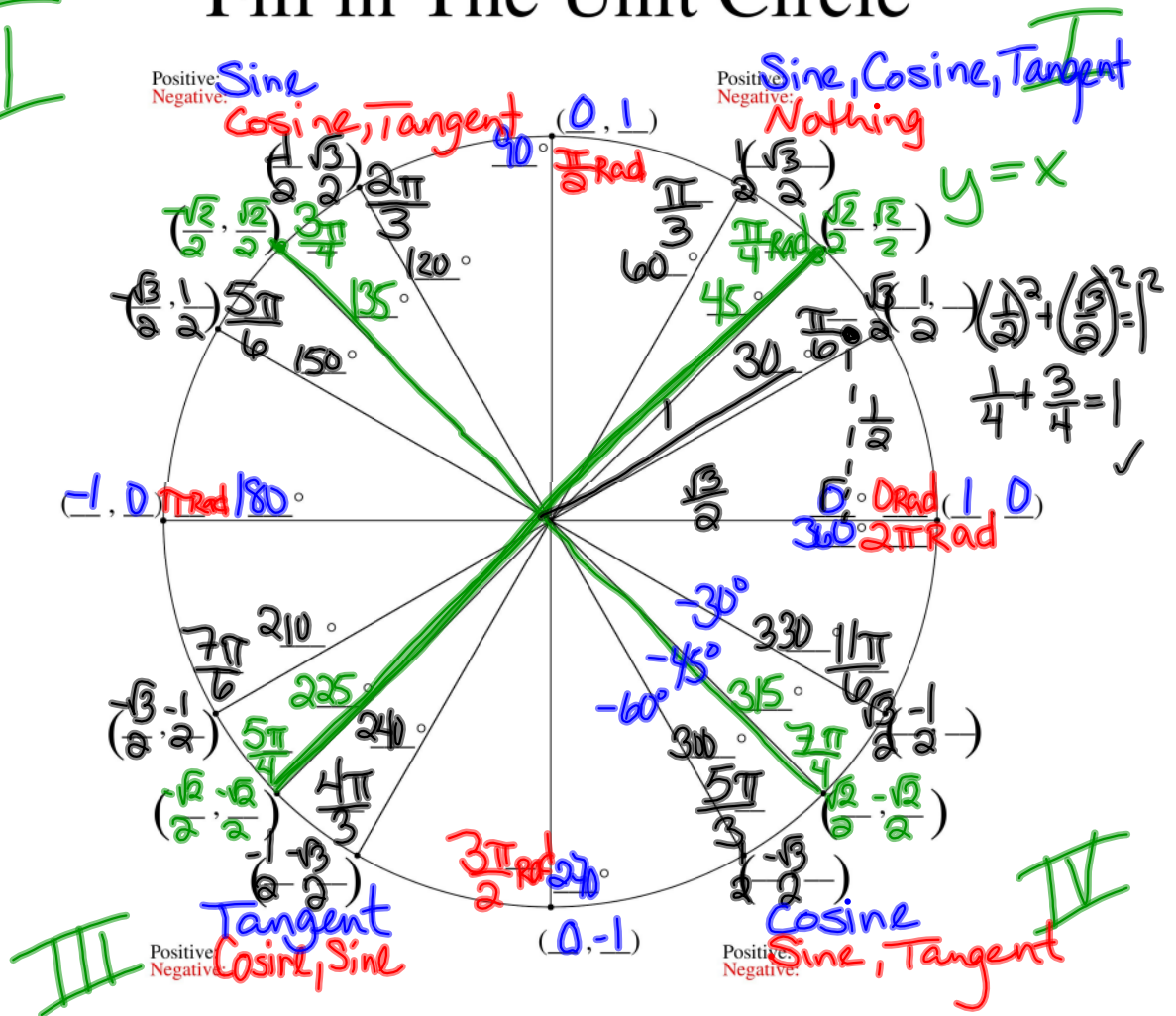


initial ray/side-
 Start of an angle

terminal ray/side-
 end of an angle

Fill in The Unit Circle

II



EmbeddedMath.com

I

Angle Measure (θ)	Sine ($\sin \theta$)	Cosine ($\cos \theta$)	Tangent ($\tan \theta$)	Coordinates (x,y) ($\cos \theta, \sin \theta$)
0° 0 radians	0	1	0	(1, 0)
30° $\frac{\pi}{6}$ radians	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$	$(\frac{\sqrt{3}}{2}, \frac{1}{2})$
45° $\frac{\pi}{4}$ radians	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	$(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$
60° $\frac{\pi}{3}$ radians	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$(\frac{1}{2}, \frac{\sqrt{3}}{2})$
90° $\frac{\pi}{2}$ radians	1	0	undefined	(0, 1)

II

120° $\frac{2\pi}{3}$ radians	$\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$-\sqrt{3}$	$(-\frac{1}{2}, \frac{\sqrt{3}}{2})$
135° $\frac{3\pi}{4}$ radians	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	-1	$(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$
150° $\frac{5\pi}{6}$ radians	$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{\sqrt{3}}$	$(-\frac{\sqrt{3}}{2}, \frac{1}{2})$
180° π radians	0	-1	0	(-1, 0)

III

210° $\frac{7\pi}{6}$ radians	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$	$(-\frac{\sqrt{3}}{2}, -\frac{1}{2})$
225° $\frac{5\pi}{4}$ radians	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	1	$(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$
240° $\frac{4\pi}{3}$ radians	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$-\sqrt{3}$	$(-\frac{1}{2}, -\frac{\sqrt{3}}{2})$
270° $\frac{3\pi}{2}$ radians	-1	0	undefined	(0, -1)

IV

300° $\frac{5\pi}{3}$ radians	$-\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$-\sqrt{3}$	$(\frac{1}{2}, -\frac{\sqrt{3}}{2})$
315° $\frac{7\pi}{4}$ radians	$-\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	-1	$(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$
330° $\frac{11\pi}{6}$ radians	$-\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$-\frac{1}{\sqrt{3}}$	$(\frac{\sqrt{3}}{2}, -\frac{1}{2})$
360° 2π radians	0	1	0	(1, 0)

330°
315°
300°

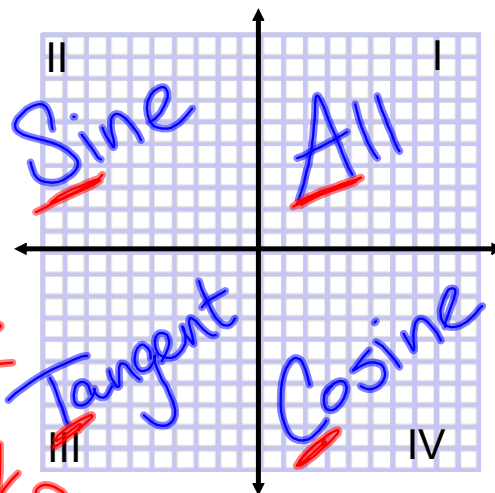
-30° $-\frac{\pi}{6}$ radians				
-45° $-\frac{\pi}{4}$ radians				
-60° $-\frac{\pi}{3}$ radians				

What is the relationship with the (x,y) values and the values of the trig functions?

$$\text{Alg } (x,y) \rightarrow \text{TRIG } (\cos\theta, \sin\theta)$$

What is the relationship with the signs of each trig function in each quadrant?

Alvin
Simon
& Theodore
are
Chipmunks



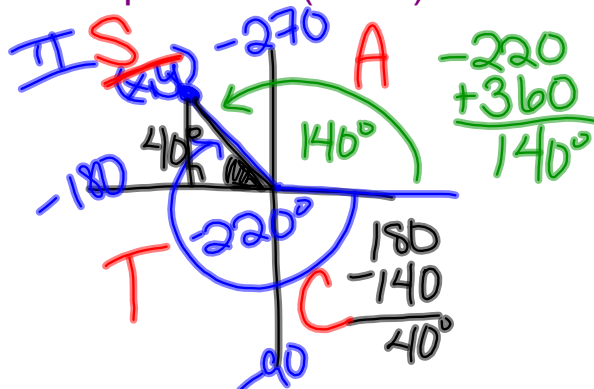
All
Students
Take
Calculus

Reference Angles

reference angle triangles drawn perpendicular to X-axis w/ ∇ @ (0,0)
acute

Quadrant II Reference Angles:

Express $\cos(-220^\circ)$ as a function of a positive acute angle.



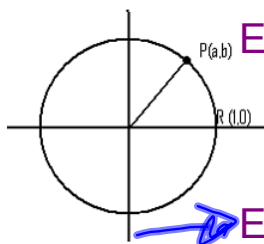
$$\cos(-220) = \cos(140)$$

$$= -\cos(40)$$

```

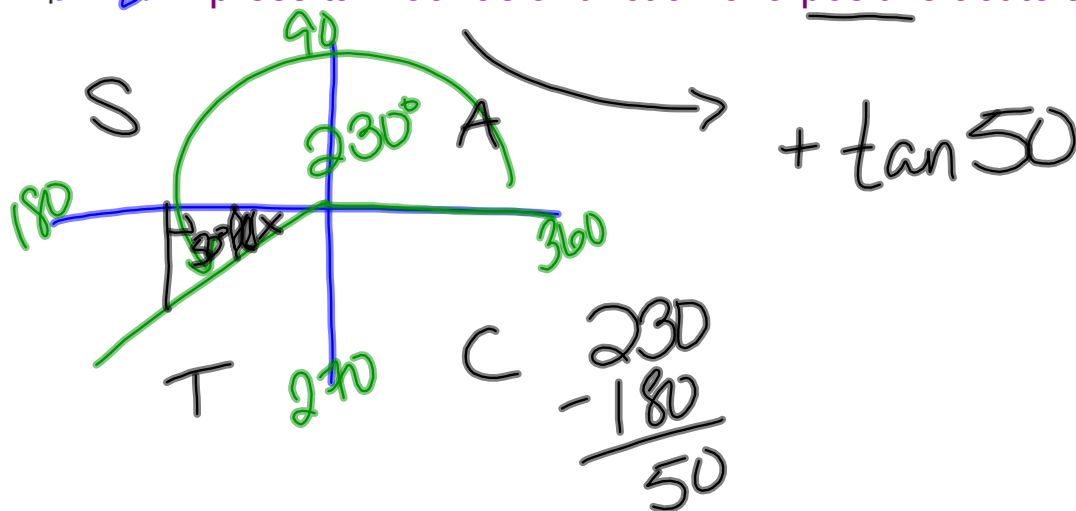
sin-1(8/17
    28.07248694
cos(-220
    -.7660444431
cos(140
    -.7660444431
  
```

Quadrant III Reference Angles:

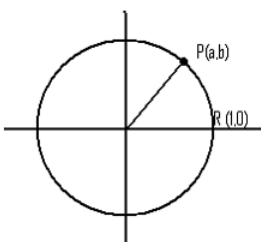


Express $\cos(-155^\circ)$ as a function of a positive acute angle

Express $\tan 230^\circ$ as a function of a positive acute angle.



Quadrant IV Reference Angles:

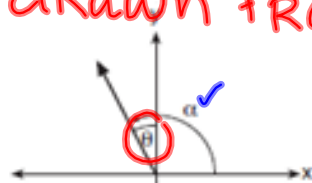
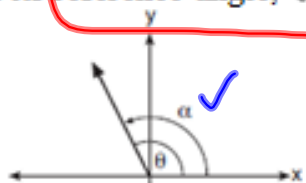


Express $\sin(-215^\circ)$ as a function of a positive acute angle.

Express $\sin(-170^\circ)$ as a function of a positive acute angle.

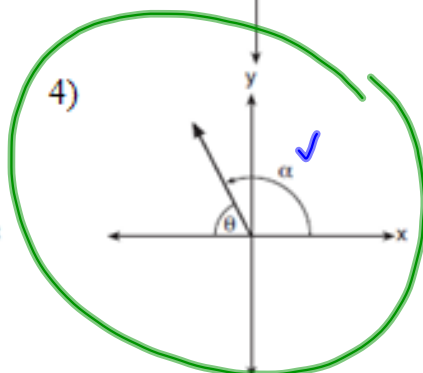
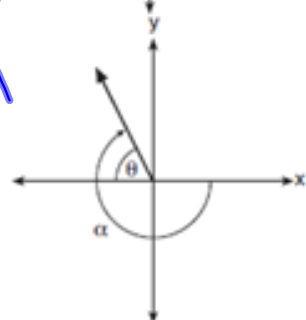
Which diagram represents an angle, α , measuring $\frac{13\pi}{20}$ radians drawn in standard position, and its reference angle, θ ?

1)



drawn from X-axis acute

~~2)~~

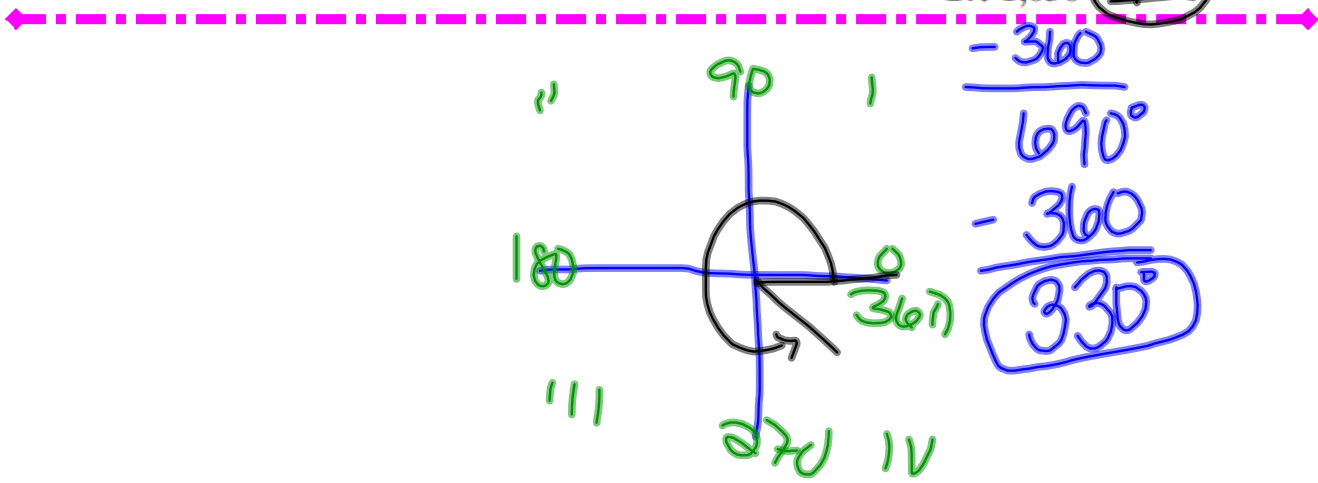


Developing Skills HW: p. 361 #3-17 odd

In 3-7, draw each angle in standard position. 3. 45° 5. -180° 7. 110°

In 8-17, name the quadrant in which an angle of each given measure lies.

9. 150° 11. 300° 13. -200° 15. -400° 17. $1,050^\circ$ **IV**



HW: p. 391 #12-14, 21-22, 31-32

In 8–17, for each angle with the given degree measure, find the measure of the reference angle.

12. 285°

13. 310°

14. 95°

In 18–27, express each given function value in terms of a function value of a positive acute angle (the reference angle).

21. $\cos 312^\circ$

22. $\tan 170^\circ$

In 28–43, for each function value, if $0^\circ \leq \theta < 360^\circ$, find, to the nearest degree, two values of θ .

~~**31.** $\tan \theta = 1.4281$ **32.** $\sin \theta = 0.8090$~~

Attachments

blankunitcircle-letter.pdf