Previous notes from ch.6:

Principal values create a unique (one) solution:

Sinθ and Tanθ → Quadrant I (+)

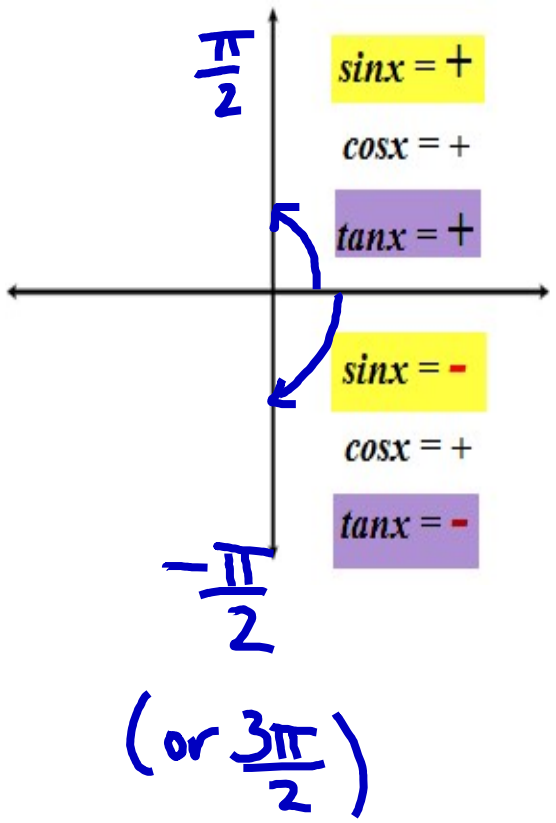
Quadrant IV (-)

Cosθ → Quadrant I (+)

Quadrant II (-)

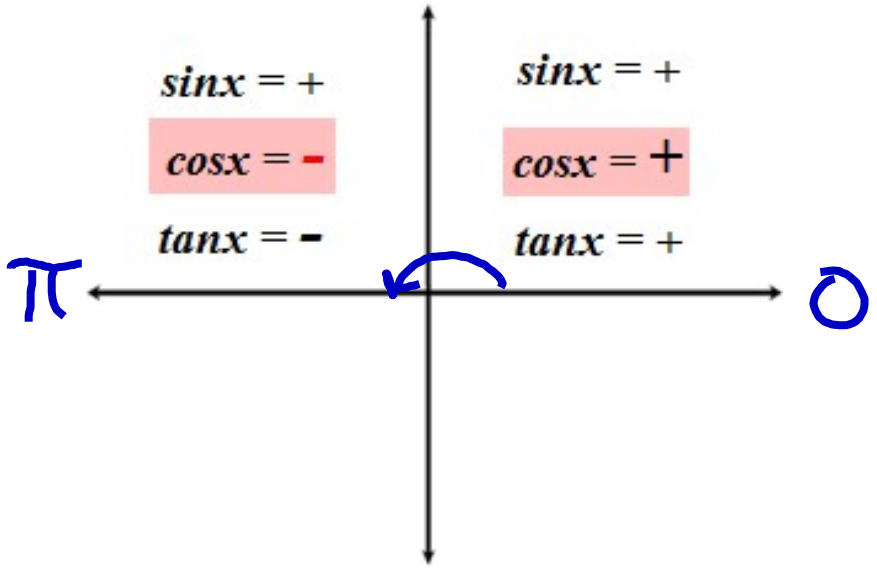
↑ **UPPER CASE** letters are often used to indicate principal values *(domain and range restrictions)*

$\sin x$, $\tan x$ $\quad -\frac{\pi}{2} \le x \le \frac{\pi}{2}$ $\quad$ *Quadrants I, IV*



Additional notes:

$\cos x$ $\quad 0° \le x \le \pi$ $\quad$ *Quadrants I, II*



NEW!! Ch.5 Inverse Notation:

$\arcsin\frac{1}{2}$ has the same meaning as $\sin^{-1}\frac{1}{2}$

IMPORTANT! Both can be rewritten as: $\sin\theta = \frac{1}{2}$

$\arccos\frac{\sqrt{2}}{2}$ has the same meaning as $\cos^{-1}\frac{\sqrt{2}}{2}$

$\arctan\sqrt{3}$ has the same meaning as $\tan^{-1}\sqrt{3}$

Summary of ch.5 Inverse Notation:

$\sin^{-1}(\frac{1}{2})$ and *Arc*sin(½) both indicate you are performing an inverse operation (not a reciprocal!!!)

Therefore... $\sin^{-1}(\frac{1}{2})$ and *Arc*sin(½) can both be rewritten as $\sin x = \frac{1}{2}$.

*Similar idea:

$\sqrt{9}$ indicates an operation.

although it can be rewritten as $x^2 = 9$

TODAY'S ASSIGNMENT #1-30…NO CALCULATOR!

Ch.5 Unit Circle Practice **NAME:** **PER:**

A. Define each function in terms of x and y (based on the unit circle with r = 1)

$\frac{y}{r}$ sin θ = y cos θ = $\frac{x}{r}$ x tan θ = $\frac{y}{x}$ csc θ = $\frac{1}{y}$ sec θ = $\frac{1}{x}$ cot θ = $\frac{x}{y}$

B. Principal Values: To find a unique solution for sin$x$ and tan$x$, refer only to Quadrant I (+) **or** IV (−)

To find a unique solution for cos$x$, refer only to Quadrant I (+) **or** II (−)

Check answers A, B, and #1-30:

-1	$\frac{-1}{2}$	$\frac{-\sqrt{3}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\pi}{6}$	$\frac{-\pi}{3}$ or $\frac{5\pi}{3}$	$\frac{-\pi}{4}$ or $\frac{7\pi}{4}$	$\frac{5\pi}{4}$
-1	$\frac{1}{2}$	$\frac{-\sqrt{3}}{2}$	$\frac{-\sqrt{3}}{3}$	$\frac{\pi}{6}$	$\frac{4\pi}{3}$	$\frac{\pi}{4}$	$\frac{\pi}{2}$
1	$\frac{-\sqrt{2}}{2}$	$\frac{-\sqrt{3}}{2}$	$-\sqrt{3}$	$\frac{5\pi}{6}$	$\frac{5\pi}{3}$	$\frac{3\pi}{4}$	$\frac{3\pi}{2}$
1	$\frac{\sqrt{2}}{2}$	$\frac{-\sqrt{3}}{2}$	$-\sqrt{3}$	undefined	x y	$\frac{5\pi}{4}$	π
0			$\sqrt{3}$				
0		I II	I IV	$\frac{y}{x}$ $\frac{x}{y}$	$\frac{1}{x}$ $\frac{1}{y}$		
$\frac{-1}{2}$							

Refer to one of your unit circles resource pages from the past few days to answer the following questions:

Refer to x and y coordinates on unit circle to identify the proper angle.

$\frac{y}{x}$ $\tan\theta = 1$

$\frac{y}{x}$ $\tan\theta = 0$

$\sin\theta = -\frac{\sqrt{3}}{2}$

y

$\sin\theta = 0$

y

Hint: *TWO* general solutions each!!

21. arctan (1) = $\frac{\pi}{4} + \frac{5\pi}{4}$

HINT: same as $\tan^{-1}(1)$

→ rewrite as $\tan\theta = 1$, then evaluate

22. $\tan^{-1}(0) =$ $0, \pi$

23. $\sin^{-1}\left(\frac{-2\sqrt{3}}{4_2}\right) =$ $\frac{4\pi}{3}$ $\frac{5\pi}{3}$

24. arccos (0) =

25. $\cos^{-1}\left(\frac{-\sqrt{2}}{2}\right) =$

26. $\arcsin\left(\frac{1}{2}\right) =$

Hint: *ONE* solution each!!

Sine and Tangent have principal values in quadrants I and IV only.

27. Arcsin (0) = 0 (not 2π) → use smallest possible angle

28. Arctan $\left(\frac{\sqrt{3}}{3}\right) =$

29. Arctan (-1) =

30. Arctan $\left(\frac{-4\sqrt{3}}{4}\right) =$

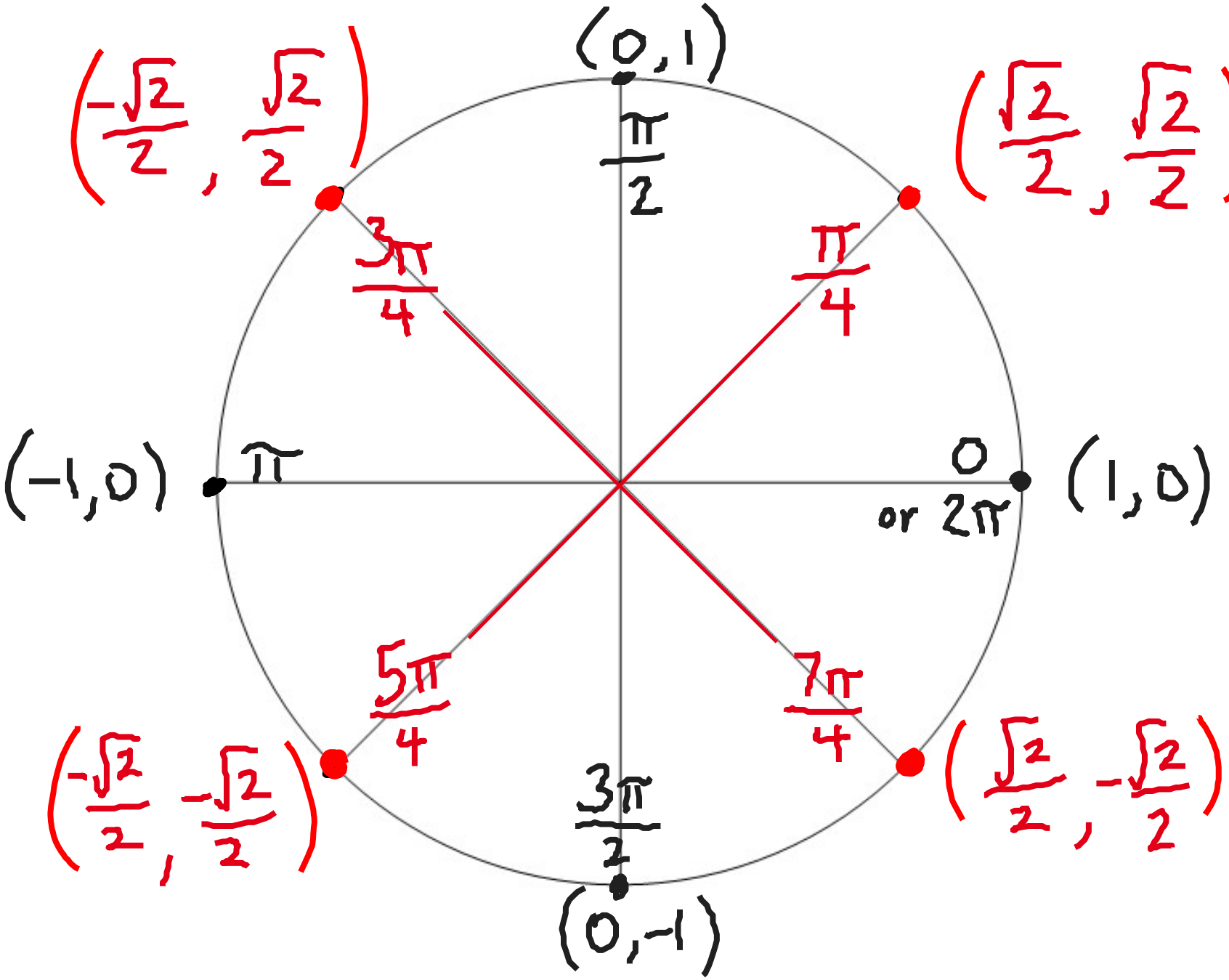
Hint for #1-20: add or subtract a rotation of 2π if given angle is less than 0 or greater than 2π

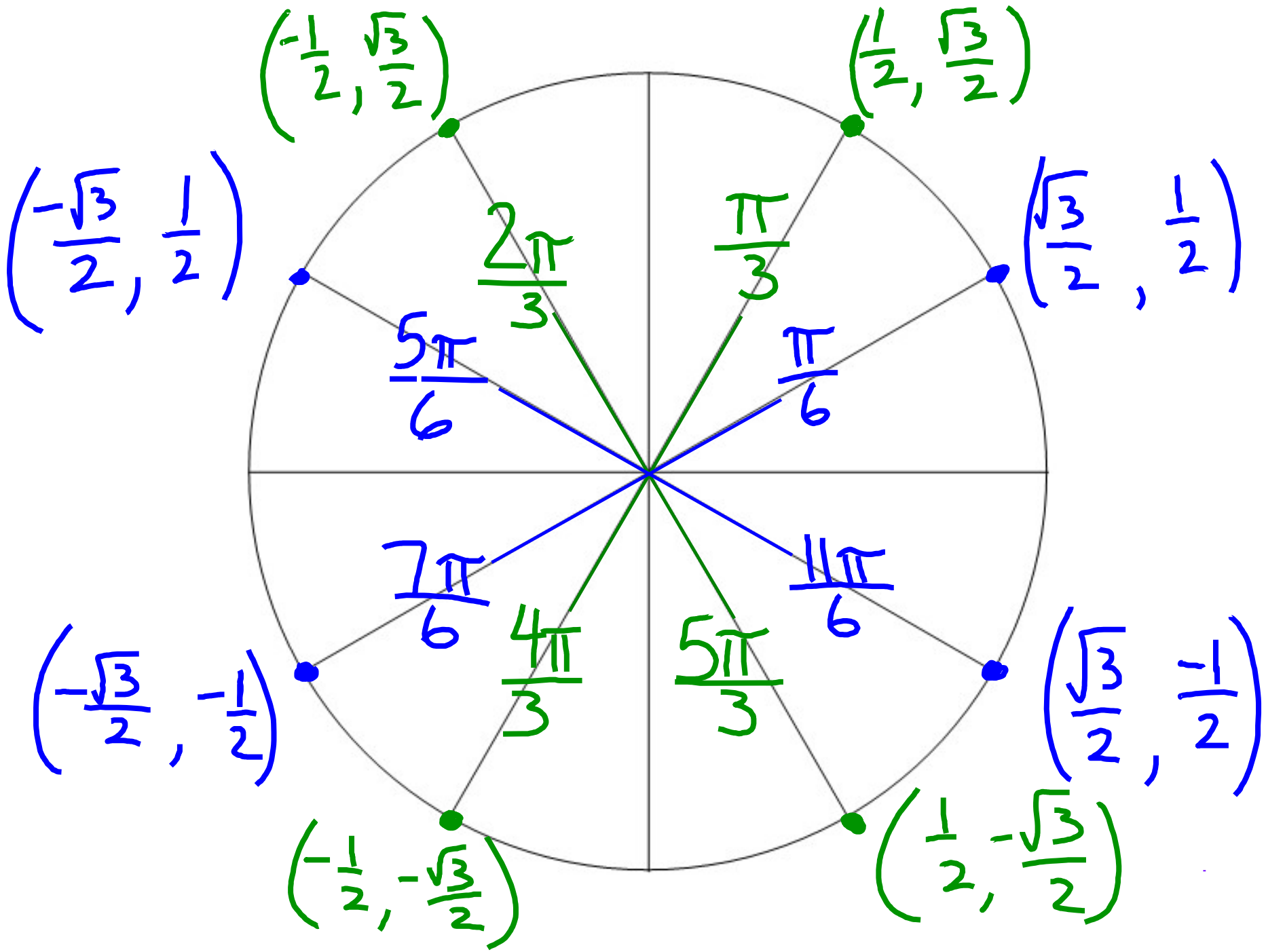
Refer to one of your unit circles resource pages from the past few days to answer the following questions:

Evaluate using *exact* answers.
No calculator!!

1. $\sin\frac{5\pi}{3}=$
2. $\cos\frac{5\pi}{6}=$
3. $\tan\frac{2\pi}{4}=$
4. $\tan\left(-\frac{5\pi}{4}\right)=$
5. $\cos\frac{8\pi}{3}=$
6. $\cos\left(-\frac{5\pi}{6}\right)=$
7. $\tan\frac{7\pi}{4}=$
8. $\sin\frac{3\pi}{4}=$
9. $\cos\frac{11\pi}{6}=$
10. $\tan\frac{10\pi}{6}=$
11. $\sin\frac{5\pi}{2}=$
12. $\tan\frac{5\pi}{6}=$
13. $\sin\pi=$
14. $\sin\frac{5\pi}{4}=$
15. $\tan\frac{8\pi}{6}=$
16. $\sin\frac{19\pi}{6}=$
17. $\cos\frac{5\pi}{3}=$
18. $\tan\frac{5\pi}{4}=$
19. $\cos\frac{5\pi}{6}=$
20. $\tan\left(-\frac{4\pi}{3}\right)=$

Hint for #1-20: add or subtract a rotation of 2π if given angle is less than 0 or greater than 2π


(0,1)
$\frac{\pi}{2}$
$\left(\frac{-\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$
$\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$
$\frac{3\pi}{4}$
$\frac{\pi}{4}$
(-1,0)
π
0
or 2π
(1,0)
$\frac{5\pi}{4}$
$\frac{7\pi}{4}$
$\left(\frac{-\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}\right)$
$\left(\frac{\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}\right)$
$\frac{3\pi}{2}$
(0,-1)


$\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$
$\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$
$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$
$\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$
$\frac{\pi}{3}$
$\frac{2\pi}{3}$
$\frac{\pi}{6}$
$\frac{5\pi}{6}$
$\left(\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$
$\left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$
$\frac{11\pi}{6}$
$\frac{7\pi}{6}$
$\frac{5\pi}{3}$
$\frac{4\pi}{3}$
$\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$
$\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$