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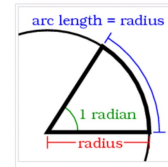
What is a radian?
What are coterminal angles?

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Trigonometry Review

Introduction to Radian Measure:

1. Draw a circle with the radius marked.
2. From the point where the radius meets the circumference of the circle, measure one radius length along the circumference of the circle moving counterclockwise and mark this point.
3. Draw a line from this mark back to the center of the circle.
4. The angle so formed is considered to be of size one in trigonometry; this is measuring in "radians".



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Radian and Degree Measure:

Full rotation = 360°

If $r=1$

$$C = 2\pi r$$

$$C = 2\pi = 360^\circ = 2(3.14) = 6.28\dots$$

$$\pi = 180^\circ$$

Quadrantal Angles: $0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$

Change radians to degrees:

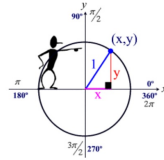
$$\pi = 180^\circ$$

$$\frac{\pi}{180} = 1 = \frac{180}{\pi}$$

- multiply by $\frac{180}{\pi}$

change degrees to radians:

- multiply by $\frac{\pi}{180}$



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Examples:

Convert from radians to degrees:

$$1. \frac{\pi}{4}$$

$$\frac{\pi}{4} \cdot \frac{180}{\pi} = 45^\circ$$

$$2. \frac{7\pi}{6}$$

$$\frac{7\pi}{6} \cdot \frac{180}{\pi} = 210^\circ$$

$$3. \frac{3\pi}{2}$$

$$\frac{3\pi}{2} \cdot \frac{180}{\pi} = 270^\circ$$

Convert from degrees to radians:

$$4. 35^\circ$$

$$35^\circ \cdot \frac{\pi}{180} = \frac{7\pi}{36}$$

$$5. 60^\circ$$

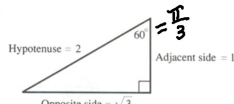
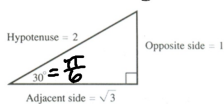
$$60^\circ \cdot \frac{\pi}{180} = \frac{\pi}{3}$$

$$6. 135^\circ$$

$$135^\circ \cdot \frac{\pi}{180} = \frac{3\pi}{4}$$

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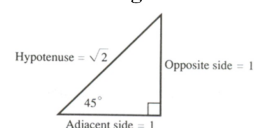
30 - 60 - 90 Triangle:



$$\begin{aligned} \sin \frac{\pi}{6} &= \frac{1}{2} & \sin \frac{\pi}{3} &= \frac{\sqrt{3}}{2} \\ \cos \frac{\pi}{6} &= \frac{\sqrt{3}}{2} & \cos \frac{\pi}{3} &= \frac{1}{2} \\ \tan \frac{\pi}{6} &= \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3} & \tan \frac{\pi}{3} &= \sqrt{3} \\ \cot \frac{\pi}{6} &= \sqrt{3} & \cot \frac{\pi}{3} &= \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3} \\ \sec \frac{\pi}{6} &= \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3} & \sec \frac{\pi}{3} &= 2 \\ \csc \frac{\pi}{6} &= 2 & \csc \frac{\pi}{3} &= \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3} \end{aligned}$$

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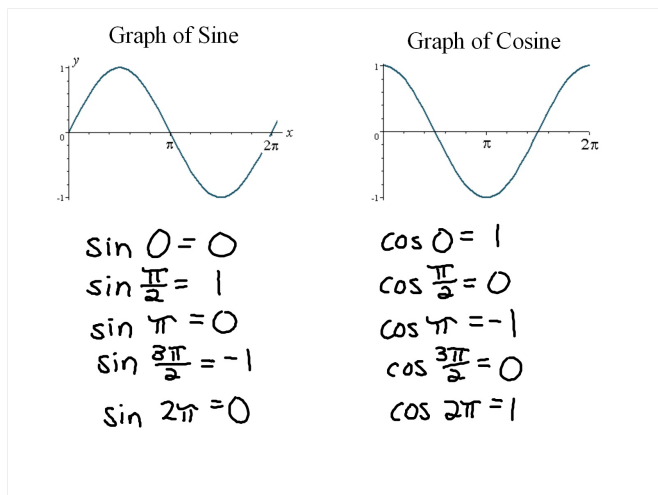
45 - 45 - 90 Triangle:



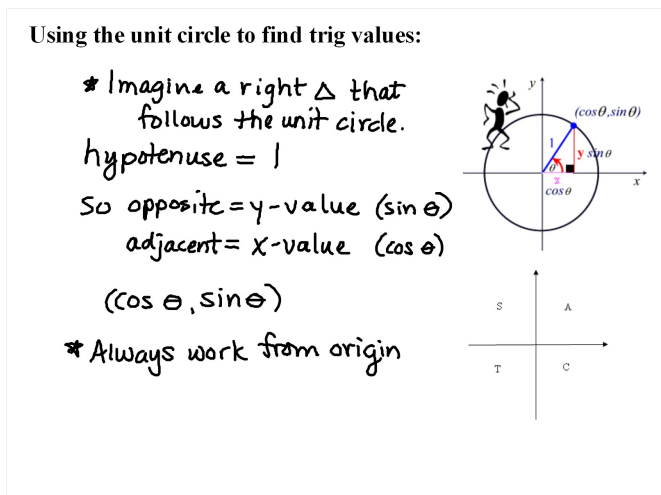
$$45^\circ = \frac{\pi}{4}$$

$$\begin{aligned} \sin \frac{\pi}{4} &= \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \\ \cos \frac{\pi}{4} &= \frac{\sqrt{2}}{2} \\ \tan \frac{\pi}{4} &= 1 \\ \cot \frac{\pi}{4} &= 1 \\ \sec \frac{\pi}{4} &= \sqrt{2} \\ \csc \frac{\pi}{4} &= \sqrt{2} \end{aligned}$$

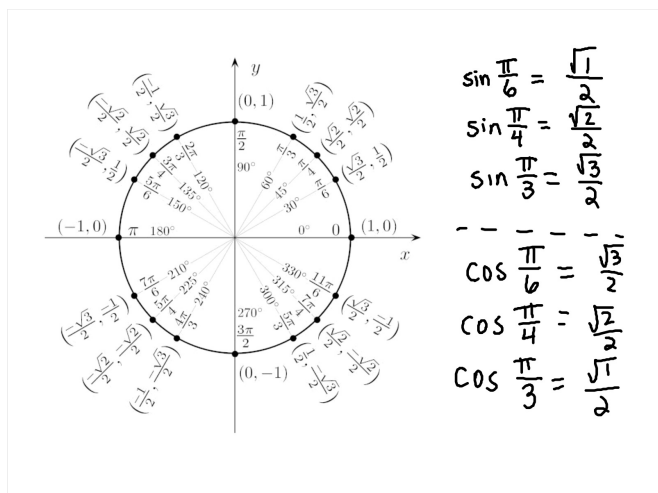
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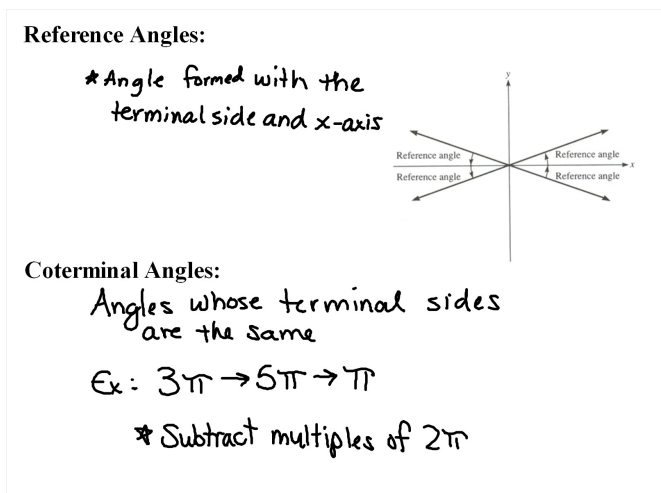
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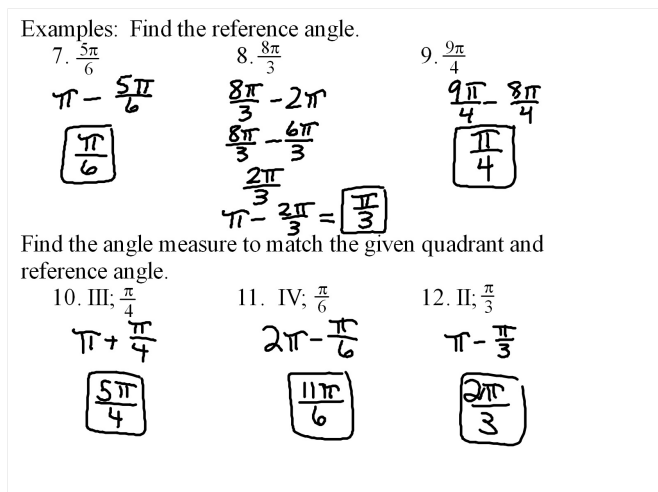
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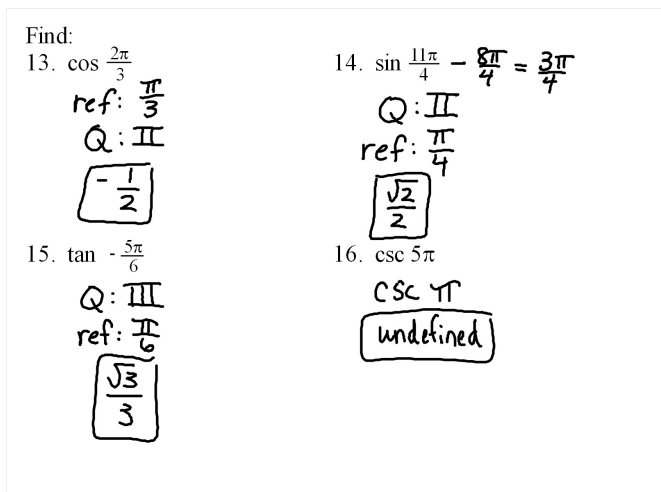
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Find x in radians. Use the domain $[0, 2\pi]$.

17. $\sin x = -\frac{1}{2}$
 $\arcsin x = -\frac{1}{2}$

ref: $\frac{\pi}{6}$

Q: III, IV

$\boxed{\frac{7\pi}{6}, \frac{11\pi}{6}}$

19. $\cos x = -\frac{\sqrt{2}}{2}$

ref: $\frac{\pi}{4}$

Q: II, III

$\boxed{\frac{3\pi}{4}, \frac{5\pi}{4}}$

18. $\tan x = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

Q: I, III

ref: $\frac{\pi}{6}$

$\boxed{\frac{\pi}{6}, \frac{7\pi}{6}}$

20. $\sec x = \sqrt{2}$

ref: $\frac{\pi}{4}$

Q: I, IV

$\boxed{\frac{\pi}{4}, \frac{7\pi}{4}}$

Degrees	Radians	Sine	Cosine	Tangent	Cotangent	Secant	Cosecant
0	0	0	1	0	und	1	und
30	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	$\sqrt{3}$	$\frac{2\sqrt{3}}{3}$	2
45	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	1	$\sqrt{2}$	$\sqrt{2}$
60	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{\sqrt{3}}{3}$	2	$\frac{2\sqrt{3}}{3}$
90	$\frac{\pi}{2}$	1	0	und	0	und	1
180	π	0	-1	0	und	-1	und
270	$\frac{3\pi}{2}$	-1	0	und	0	und	-1
360	2π	0	1	0	und	1	und

HOMEWORK

Worksheet: Trigonometry Review