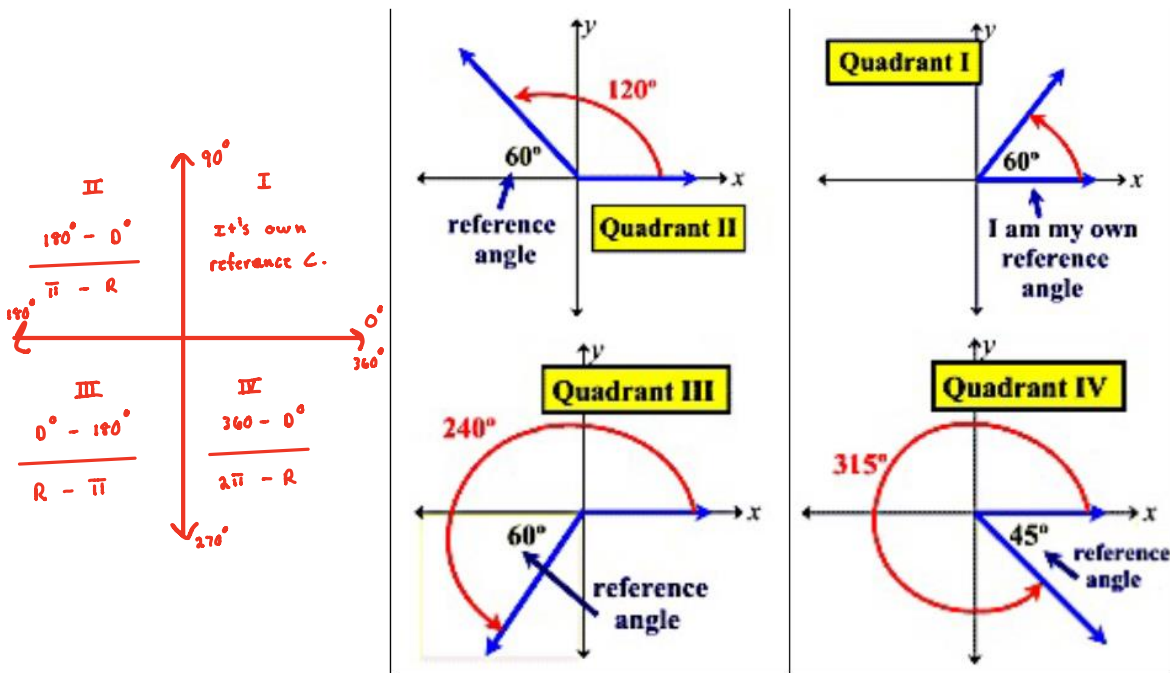


An angle drawn in standard position has a **reference angle**. The reference angle is an **acute angle** formed by the terminal side of the given angle to the x-axis.



Examples: Draw the angle in standard position and then find the reference angle.

<p>a) 150° Q: II</p> <p>$180 - 150 = 30^\circ$ (ref. \angle)</p>	<p>b) $\frac{7\pi}{6} \cdot \frac{180}{\pi} = \left(\frac{7}{6}\right) \cdot 180 = 210^\circ$ Q: III</p> <p>$210 - 180 = 30^\circ \cdot \frac{\pi}{180} = \frac{\pi}{6}$</p>	<p>First, find a coterminal \angle</p> <p>c) $-100^\circ + 360 = 260^\circ$ Q: III</p> <p>$260 - 180 = 80^\circ$</p>
--	--	---

Find the reference angle for each angle with the given measure.

<p>d) -35°</p> <p>$+360$</p> <p>325° Q: IV</p> <p>$360 - 325 = 35^\circ$</p>	<p>e) 245° Q: III</p> <p>$245 - 180 = 65^\circ$</p>	<p>f) -510°</p> <p>$+360$</p> <p>-150°</p> <p>$+360$</p> <p>210° Q: III</p> <p>$210 - 180 = 30^\circ$</p>	<p>g) $\frac{4\pi}{9} \cdot \frac{180}{\pi}$</p> <p>$\left(\frac{4}{9}\right) \cdot 180 = 80^\circ$ Q: I</p> <p>\downarrow</p> <p>$= \frac{4\pi}{9}$</p>	<p>h) $\frac{-8\pi}{5} + \frac{2\pi \cdot 5}{1 \cdot 5}$</p> <p>$-\frac{8\pi}{5} + \frac{10\pi}{5}$</p> <p>$\frac{2\pi}{5} \cdot \frac{180}{\pi} = 72^\circ$ Q: I</p> <p>10</p> <p>ref. $\angle = \frac{2\pi}{5}$</p>
--	--	--	--	---

Reference Triangle

- Formed by “dropping” a perpendicular from the terminal ray of a standard position angle to the x-axis.

Example 1: If θ is an angle in standard position and $P(-3, 4)$ is a point on the terminal side of θ , what is the value of $\cos\theta$?

Example 2: If θ is an angle in standard position and $P(3, -2)$ is a point on the terminal side of θ , what is the value of $\csc\theta$?

On Your Own:

1. If θ is an angle in standard position and $P(-4, 3)$ is a point on the terminal side of θ , what is the value of $\sin\theta$?

2. If the terminal side of θ passes through point $(-8, -6)$, what is the value $\cos\theta$?

Sketch the angle in standard position in the coordinate plane that passes through each given point, and find all six trigonometric ratios for that point.

3) $(7, 24)$

4) $(8, 15)$

5) $(-3, 3\sqrt{3})$

~~Unit 7 Day 2 HW(1)~~

~~Let P be a point on the terminal side of θ . Find the 6 trig functions for the angle.~~

~~1. a) $P(-8,6)$~~

~~b) $P(7,-24)$~~

~~c) $P(-2,-2)$~~

~~d) $P(-1,\sqrt{3})$~~

~~2. a) $P(3,4)$~~

~~b) $P(15,8)$~~

~~c) $P(5,2)$~~

~~d) $P(1,7)$~~

~~e) $P(1,1)$~~

~~e) $P(\sqrt{2},\sqrt{7})$~~

~~3. If θ is an angle in standard position and $P(-5, 13)$ is a point on the terminal side of θ , what is the value of $\sec \theta$ and $\cot \theta$?~~

~~4. If the terminal side of θ passes through point $(-5, -2)$, what is the value $\cos \theta$ and $\sin \theta$?~~

For questions 1 - 6, find the reference angle for the given angle.

1-6 ■ Find the reference angle for the given angle.

- | | | |
|---------------------------|---|-----------------------|
| 1. (a) 225° | (b) -35° | (c) 181° |
| 2. (a) 290° | (b) 750° | (c) 570° |
| 3. (a) 335° | (b) -95° | (c) 165° |
| 4. (a) $\frac{3\pi}{5}$ | (b) $\frac{7\pi}{6}$ | (c) $-\frac{2\pi}{3}$ |
| 5. (a) $\frac{17\pi}{3}$ | (b) $-\frac{\pi}{4}$ | (c) 3 |
| 6. (a) $\frac{23\pi}{11}$ | (b) $\frac{23}{11}$ | (c) $\frac{17\pi}{7}$ |

1. Let P be a point on the terminal side of θ . Draw a picture showing the reference angle and find the 6 trig functions of θ .

a) $P(12, 9)$

b) $P(30, 16)$

c) $P(1, 2)$

d) $P(3, \sqrt{7})$

e) $P(-8, -6)$

f) $P(1, -3)$

g) $P(6, -\sqrt{13})$

h) $P(-\sqrt{2}, -\sqrt{2})$