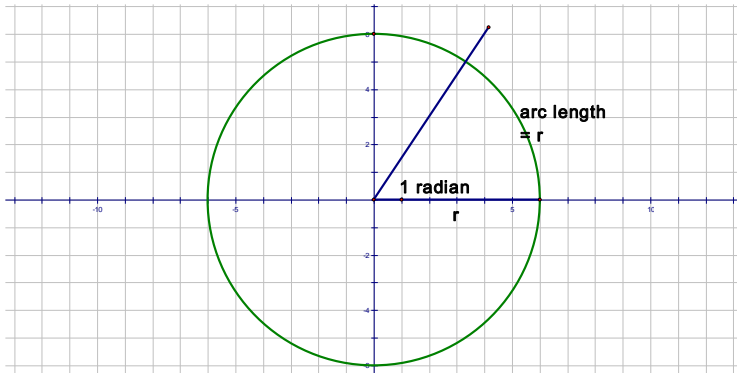When a central angle intercepts an arc that has the same length as a radius of the circle, the measure of this angle is defined to be one **radian**.

The circumference of a circle is $2\pi r$, where r is the length of a radius. There are 2π radians in one complete revolution about a point and one complete revolution equals 360°.

2π radians = 360° π radians = 180°   1 radian $\approx 57.3°$

Convert each degree measure to radian measure.

a. 120°

b. -245°

Convert each radian measure to degree measure.
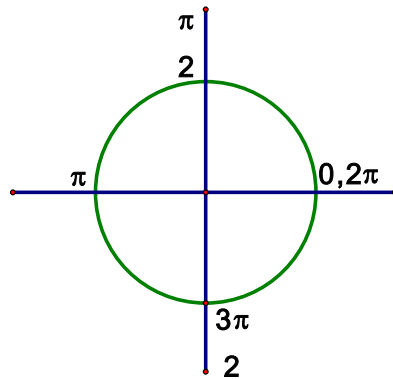
a. $\dfrac{\pi}{3}$ radians

b. $-\dfrac{3\pi}{4}$ radians

Quadrant I if $0 < \theta < \dfrac{\pi}{2}$

Quadrant II if $\dfrac{\pi}{2} < \theta < \pi$

Quadrant III if $\pi < \theta < \dfrac{3\pi}{2}$

Quadrant IV if $\dfrac{3\pi}{2} < \theta < 2\pi$

In which quadrant or on which axis does the terminal side of the angle lie?

a. $\dfrac{4\pi}{3}$

b. $-\dfrac{5\pi}{4}$

c. $\dfrac{9\pi}{2}$

1 minute (1′) = $(\dfrac{1}{60})°$ 1 second (1″) = $(\dfrac{1}{60})′$ or $(\dfrac{1}{3600})°$

Convert each angle measure as indicated.

a. 12.464° to degrees, minutes and seconds, to the nearest second.

b. 23°42′45″ to decimal degrees, to the nearest tenth.

In which quadrant, or on which axis, does the terminal side of the each angle lie?

1. 150°
2. 210°
3. -60°
4. 180°

5. -240°
6. 540°
7. 2π
8. $\dfrac{\pi}{3}$

9. $\dfrac{3\pi}{4}$
10. $\dfrac{7\pi}{3}$
11. $\dfrac{5\pi}{4}$
12. $\dfrac{10\pi}{3}$

Convert each degree measure to radian measure.

13. 150°
14. 210°
15. 45°
16. 240°

Each radian measure to degree measure.

17. $\dfrac{\pi}{6}$
18. $\dfrac{\pi}{4}$
19. $\dfrac{5\pi}{6}$
20. $\dfrac{7\pi}{6}$

Convert to degrees, minutes, and seconds, to the nearest second.

21. 23.42°
22. 15.27°
23. 48.35°
24. 62.73°

Convert to decimal degrees , to the nearest tenth of a degree.

25. $14^{\circ}33'45''$
26. $38^{\circ}24'36''$
27. $35^{\circ}45'10''$
28. $28^{\circ}32'20''$