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 2r, where r is the length of a radius. There are 2 radians in one complete revolution about a point and one complete revolution equals 360o.

**2radians = 360o**

This gives us the important result: radians = 180o

From this we can convert:

radians → degrees and degrees → radians.

  

Convert each degree measure to radian measure. Convert each radian measure to degree measure.

a. 120o b. -245o a. radians b. radians



Quadrant I if $0<θ<\frac{π}{2}$

Quadrant II if $\frac{π}{2}<θ<π$

Quadrant III if $π<θ<\frac{3π}{2}$

Quadrant IV if $\frac{3π}{2}<θ<2π$

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

a.  b.  c. 

**1 minute (1’) = ()o  1 second (1”) = ()’ or ()o**

Convert each angle measure as indicated.

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

b. 23o42’45” to decimal degrees, to the nearest tenth.

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

1. 150o 2. 210o 3. -60o 4. 180o

5. -240o 6. 540o 7. 2 8. 

9.  10.  11.  12. 

**Convert each degree measure to radian measure.**

13. 150o 14. 210o 15. 45o 16. 240o

**Convert each radian measure to degree measure.**

17.  18.  19.  20. 

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

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

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

25. 14o33’45” 26. 38o24’36” 27. 35o45’10” 28. 28o32’20”

**More practice on conversions! ☺**

**Convert from radians to degrees: (multiply by )**

1)  2)  3)  4) 

5)  6)  7)  8) 

9) 10) 7 11)  12)

**Convert from degrees to radians. (multiply by  and reduce the fractions!)**

13) 500 14) 800 15) –2100 16) 1000

17) 900 18) -1800 19) -12000 20) –450

21) 5600 22) 170 23) 3600 24) 1300

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

25) 2.478o 26) 15.129o 27) 78.3o 28) 26.708o

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

29) 11o23’4” 30) 33o27’46” 31) 73o15’1” 32) 88o3’29”

1 – 9: Determine the quadrant in which the angle lies. (The angle is given in radian measure.)



Hint: these angles are in radian, but $π$ is already included in the decimal! ☺

7. 3.5 8. 2.25 9. 5.63

Determine two **coterminal** angles in radian measure (one positive and one negative) for the given angle. Justify your answers.



Find, if possible, the complement and supplement of the angle in radian measure. You should recall complement and supplement rules from Geometry, in degrees. It works the same for radians! Try it!

