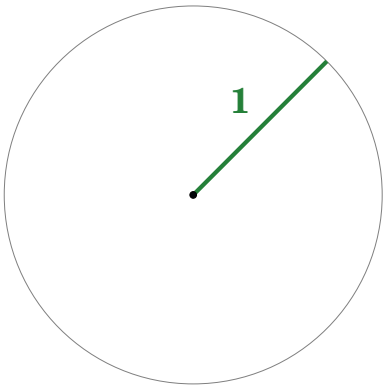
⚙ Creating the Unit Circle

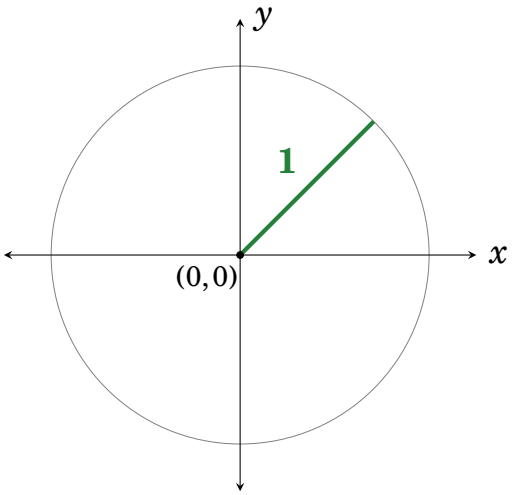
❶ The **unit circle** has a **radius** of 1 unit.

❷ The circle is placed on a **Cartesian plane** with its **center** at the origin $(0,0)$.

❶ Circle with radius 1



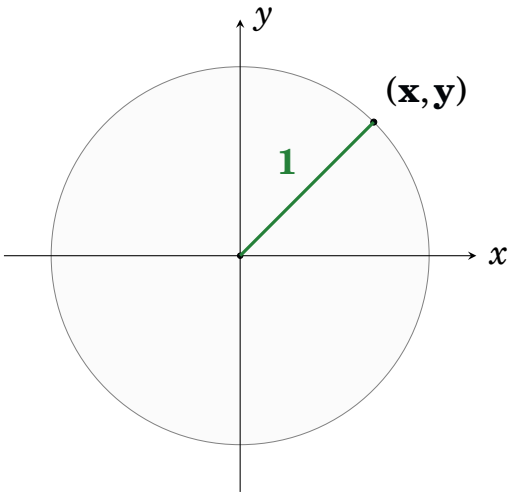
❷ Centered at (0,0)



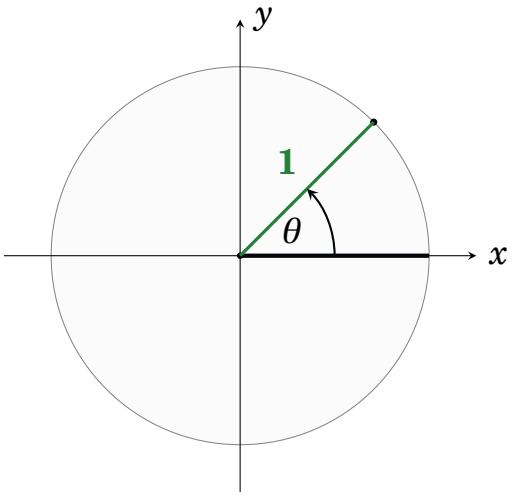
❸ Each point on the unit circle has a **coordinate**, $(\mathbf{x},\mathbf{y})$.

❹ The **radius** extending to that point forms a central angle θ.

❸ Point with coordinate (x,y)



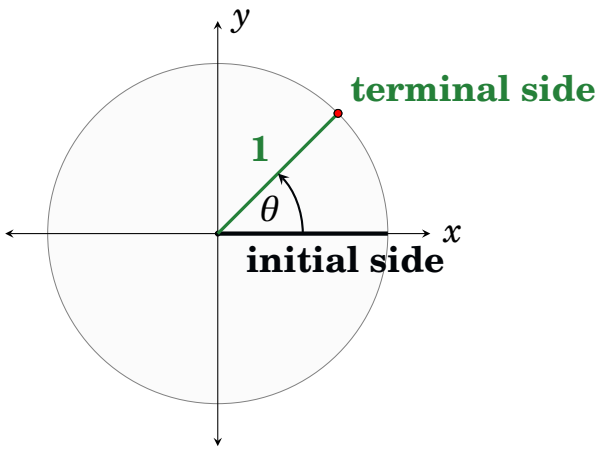
❹ Central angle θ



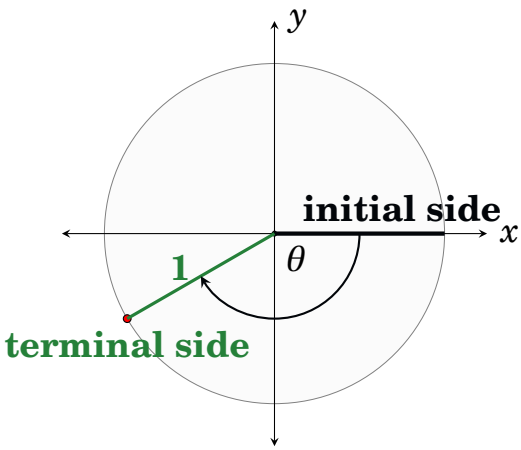
Measuring Central Angles

The **central angle** θ of a point is measured from the positive x-axis in either a **counter-clockwise** or **clockwise** direction.

Counter-clockwise

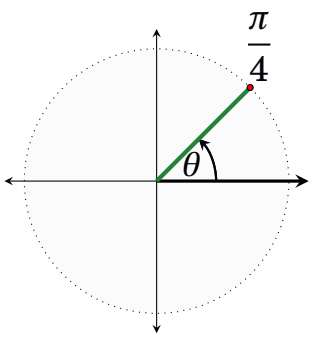


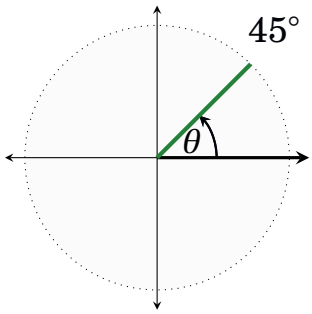
Clockwise

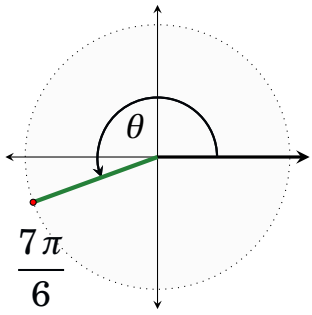


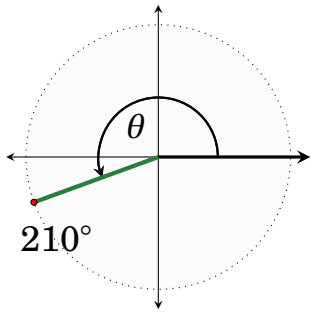
Degrees and Radians

Central angles are measured in both **degrees** (°) and **radians** (rad).





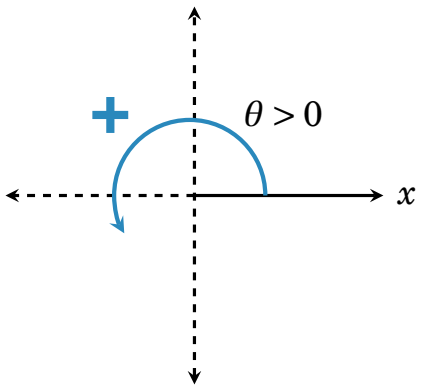




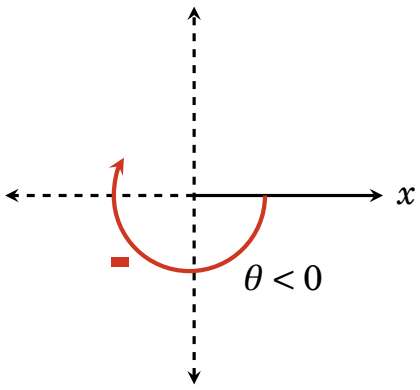
Direction of Central Angle

The sign of the angle determines the direction in which it is measured.

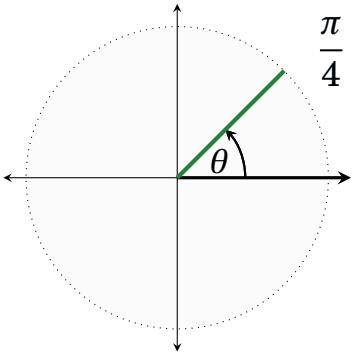
Counter-clockwise

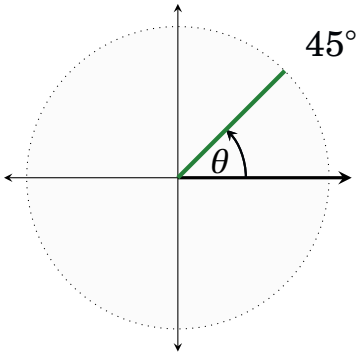


Clockwise

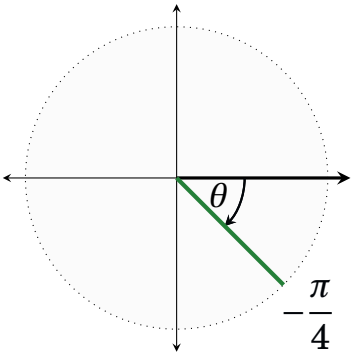


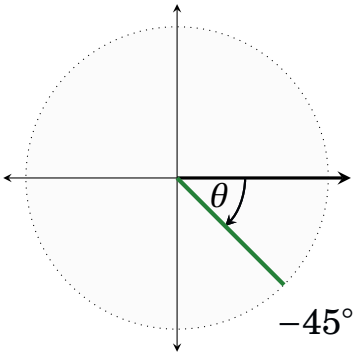
Counter-clockwise Angles





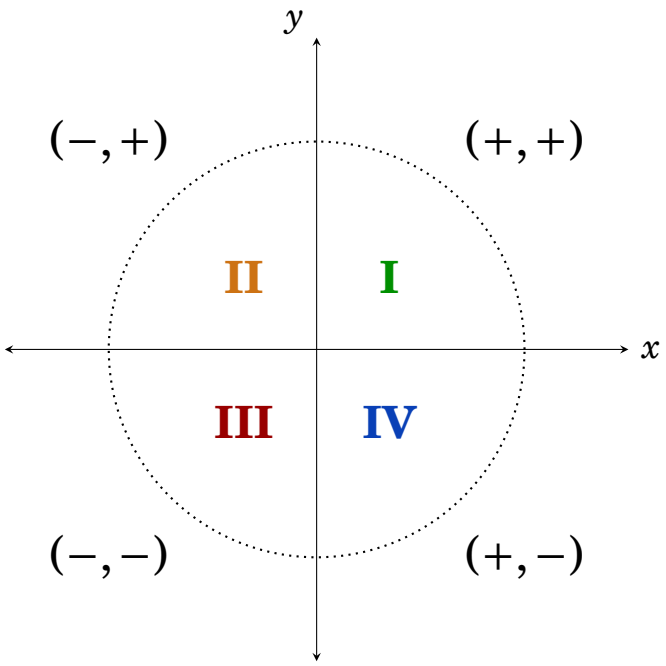
Clockwise Angles





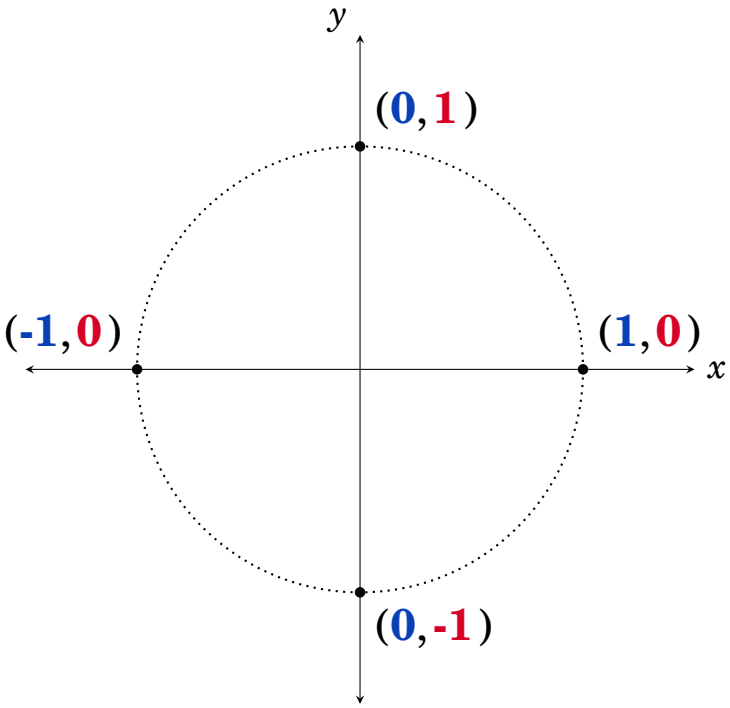
Quadrants

- The **Cartesian plane** is divided into 4 quadrants.
- Points inside a given quadrant have specific signs.

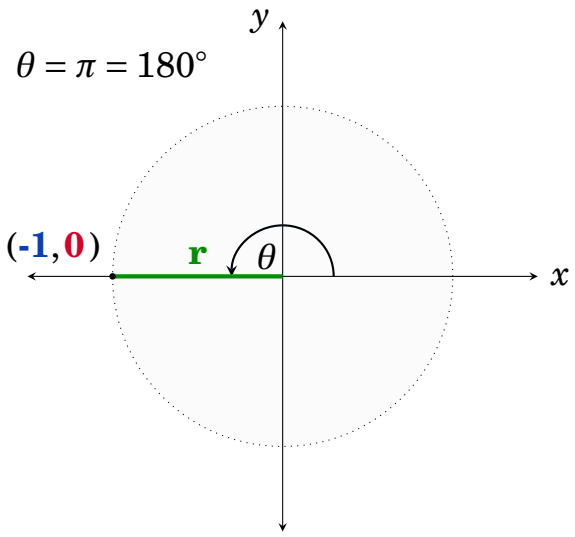


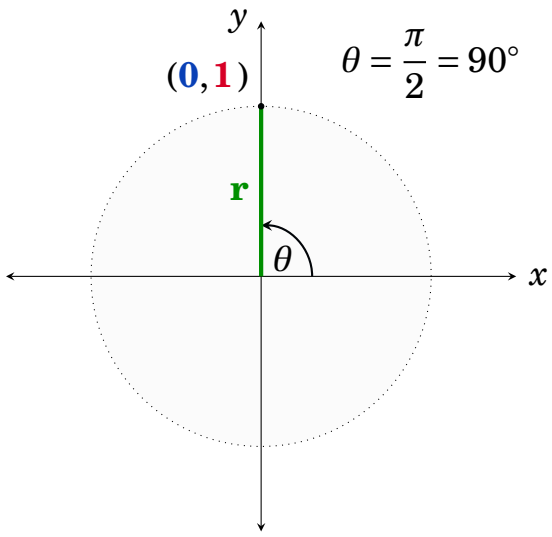
Quadrantal Angles

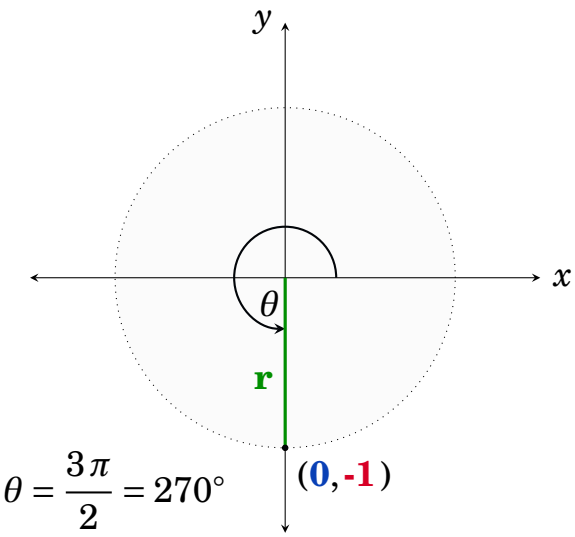
Quadrantal angles occur at points on the x-axis or y-axis.

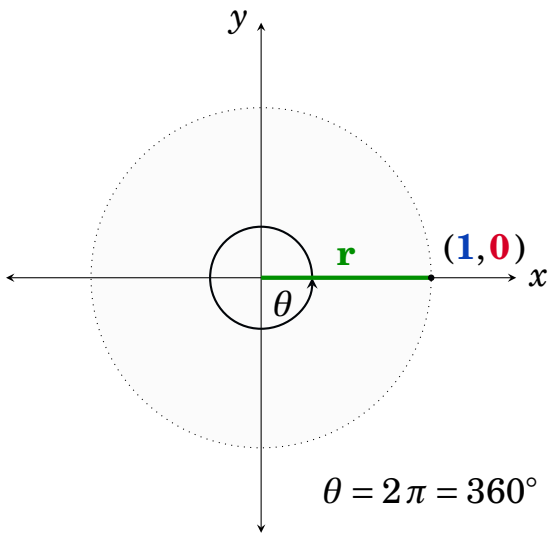


Quadrantal Angle Measurements









Angles in a Quadrant

- Each point on the unit circle forms a central angle θ.