TOPIC: ANGLES

Angles in Standard Position

◆ **Angles**: The "gap" between 2 line segments/sides, measured in degrees (°) from ___ to ____ on the x/y plane.

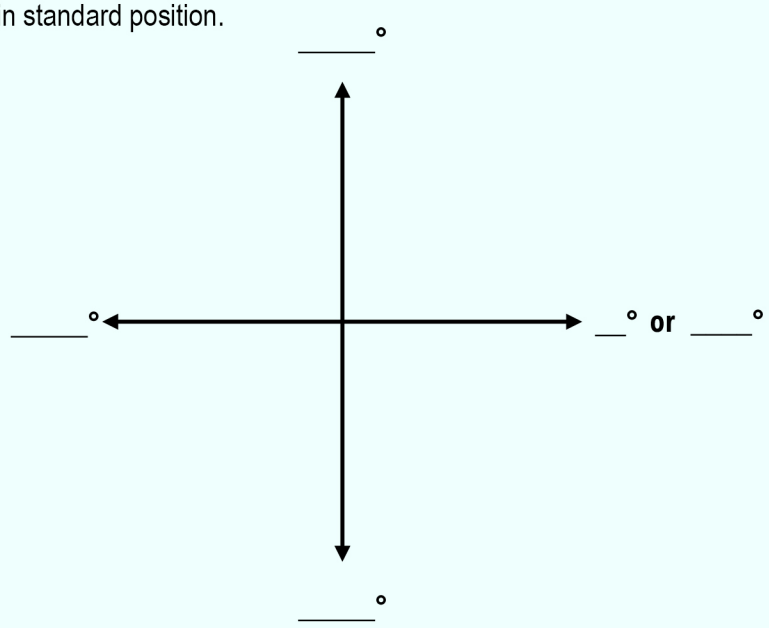
- Always draw *from* **[INITIAL | TERMINAL]** side (___-axis) *to* **[INITIAL | TERMINAL]** side ("standard position").
- Draw **positive** angles in the **[CCW ↺ | CW ↻]** direction, **negative** angles in the **[CCW ↺ | CW ↻]** direction.

EXAMPLE Sketch each angle in standard position.

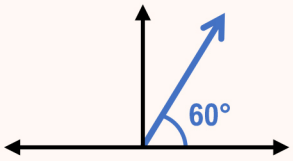
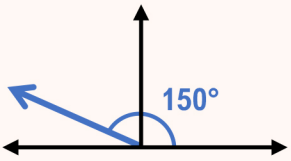
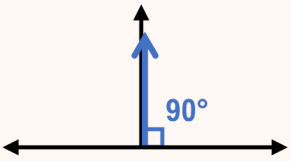
(A) $60°$

(B) $150°$

(C) $-60°$



Types of Angles

Acute ($90°$)	Obtuse ($90°$)	Right ($90°$)
		

TOPIC: ANGLES

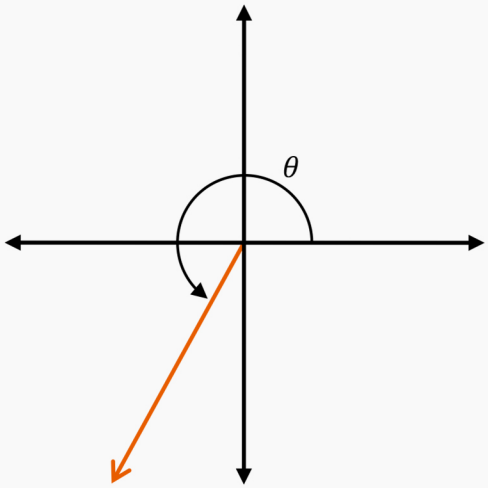
PRACTICE What is the approximate measure of the angle shown below? Choose the most reasonable answer.

$(\boldsymbol{A})\ 60°$

$(\boldsymbol{B})\ 150°$

$(\boldsymbol{C})\ 240°$

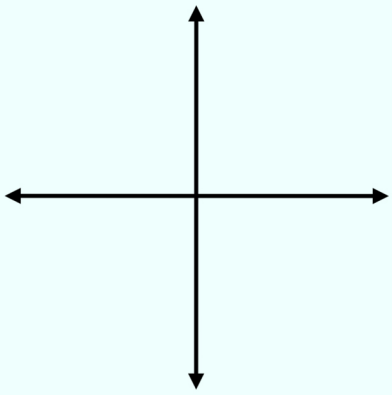
$(\boldsymbol{D})\ 300°$



EXAMPLE Sketch each angle in standard position.

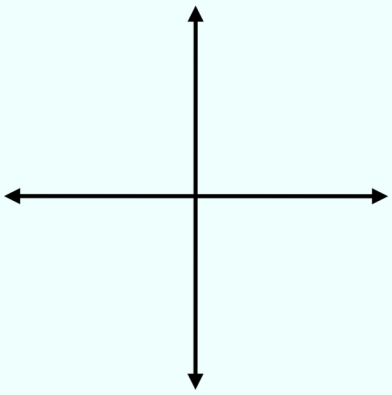
$(\boldsymbol{A})$

$45°$



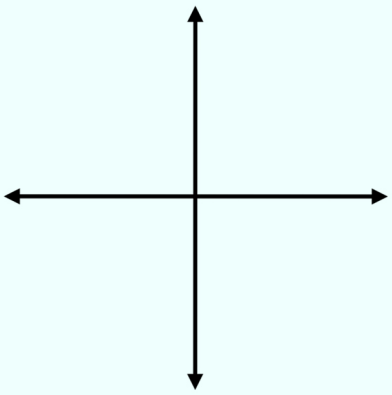
$(\boldsymbol{B})$

$210°$



$(\boldsymbol{C})$

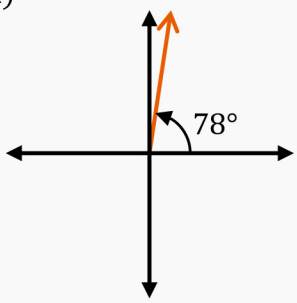
$-100°$



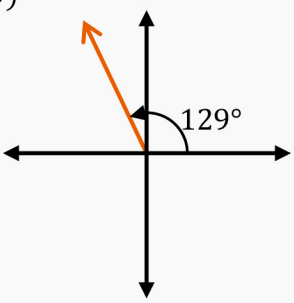
TOPIC: ANGLES

PRACTICE Which angle is **NOT** a positive angle drawn in standard position?

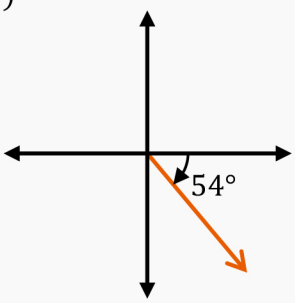
(A)



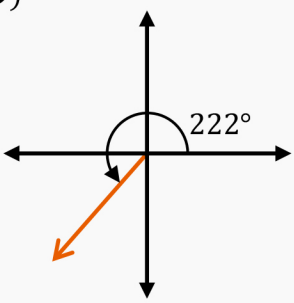
(B)



(C)



(D)



TOPIC: ANGLES

Introduction to Coterminal Angles

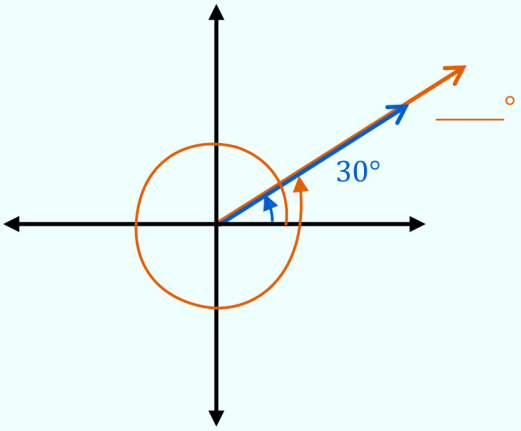
- You'll sometimes need to draw angles which are NOT between $0°$ & $360°$.
  - Angles are **COTERMINAL** if they point in the same direction, i.e. same **[INITIAL | TERMINAL]** side.
  - To find angles which are coterminal with a given angle, add or subtract multiples of _____.

EXAMPLE Find an angle between $0°$ & $360°$ which is coterminal with the given angle.

(A) $390°$

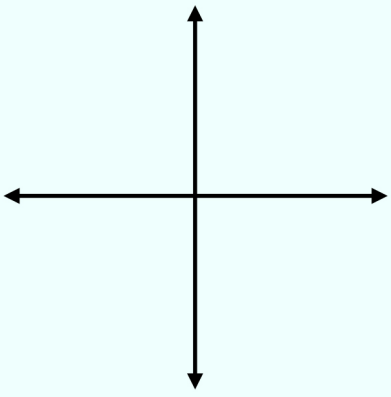
(B) $-270°$

(C) $1000°$

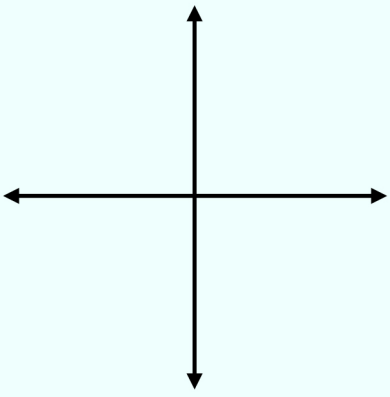


EXAMPLE Find the smallest positive angle coterminal with the given angle. Sketch the angle in standard position.

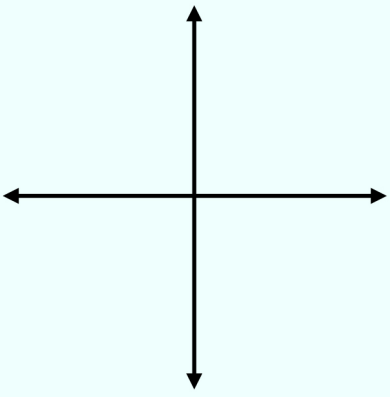
(A) $710°$



(B) $-37°$



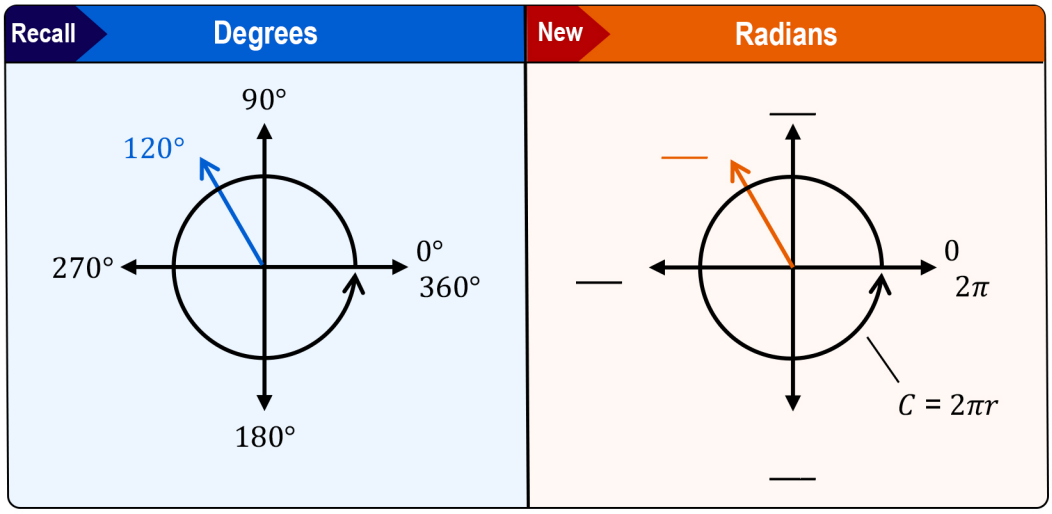
(C) $-480°$



TOPIC: ANGLES

Converting between Degrees & Radians

◆ **Radians**: A different unit for measuring angles, based on a circle's circumference. Full circle = 360° = ____ radians



New $\theta_{rad} = \frac{\pi}{180} \cdot \theta_{deg}$ *(degrees to radians)*

New $\theta_{deg} = \frac{180}{\pi} \cdot \theta_{rad}$ *(radians to degrees)*

EXAMPLE Convert the angle from degrees to radians or from radians to degrees.

(A)

$120°$

(B)

$\frac{6\pi}{5}$

TOPIC: ANGLES

PRACTICE Convert the angle $540°$ from degrees to radians.

Recall

$$\theta_r = \frac{\boldsymbol{\pi}}{\mathbf{180°}} \cdot \theta_d$$

(degrees to radians)

$$\theta_d = \frac{\mathbf{180°}}{\boldsymbol{\pi}} \cdot \theta_r$$

(radians to degrees)

PRACTICE Convert the angle $-\frac{5\pi}{6}$ from radians to degrees.

Recall

$$\theta_r = \frac{\boldsymbol{\pi}}{\mathbf{180°}} \cdot \theta_d$$

(degrees to radians)

$$\theta_d = \frac{\mathbf{180°}}{\boldsymbol{\pi}} \cdot \theta_r$$

(radians to degrees)