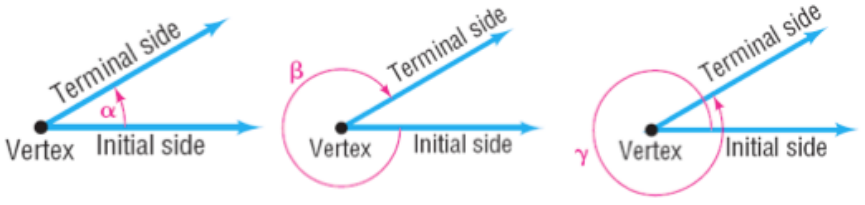
Chapter 6 Trigonometric Functions

6.1 Angles and Their Measures

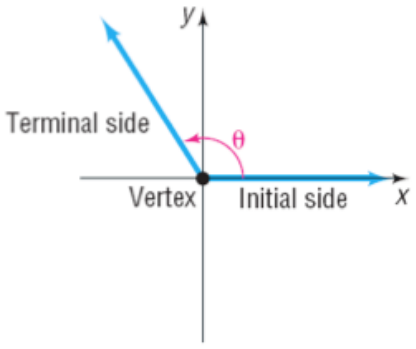


Counterclockwise rotation
Positive angle

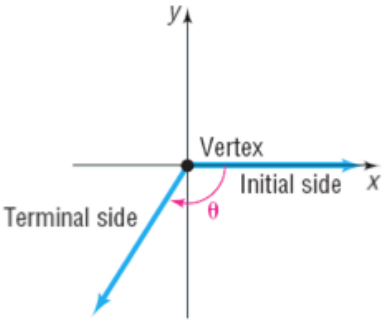
Clockwise rotation
Negative angle

Counterclockwise rotation
Positive angle

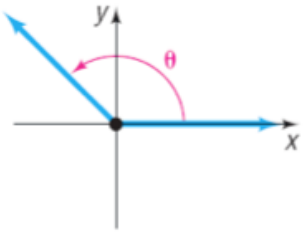
Lowercase Greek letters are used to denote angle



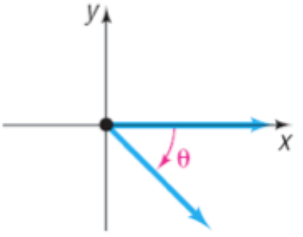
(a) θ is in standard position; θ is positive



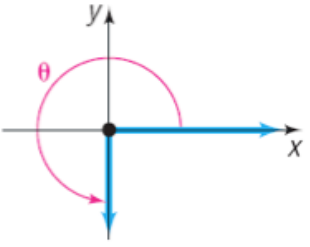
(b) θ is in standard position; θ is negative



(a) θ lies in quadrant II



(b) θ lies in quadrant IV



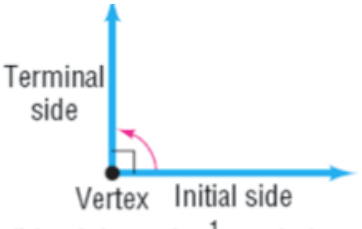
(c) θ is a quadrantal angle

We measure angles by determining the amount of rotation needed for the initial side to become coincident with the terminal side.

also called coterminal

The two commonly used measures for angles are degrees and radians. (We will be working with degrees first.)

(a) 1 revolution counterclockwise, 360°



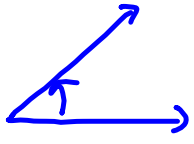
(b) right angle, $\frac{1}{4}$ revolution counter-clockwise, 90°

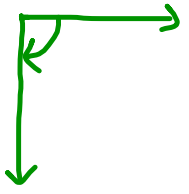
(c) straight angle, $\frac{1}{2}$ revolution counter-clockwise, 180°

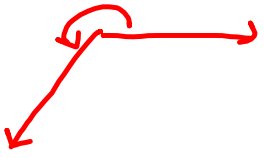
EXAMPLE **Drawing an Angle**

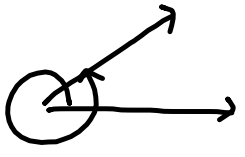
Draw each angle.

(a) $45°$ (b) $-90°$ (c) $225°$ (d) $405°$

a. 

b. 

c. 

d. 

1 Convert between Decimals and Degrees, Minutes, Seconds Measures for Angles

1 counterclockwise revolution = 360°

1° = 60′ 1′ = 60″

minutes seconds

EXAMPLE **Converting between Degrees, Minutes, Seconds, and Decimal Forms**

(a) Convert 40°12′ 5″ to a decimal in degrees. Round the answer to four decimal places.

(b) Convert 78.562° to the D°M′ S″ form. Round the answer to the nearest second.

a. $40 + 12\left(\frac{1}{60}\right) + 5\left(\frac{1}{60}\right)\left(\frac{1}{60}\right)$

$40 + .2 + .0014$

$40.2014°$

b. $78° + .562(60)$

$78° + 33.72$

$78° + 33' + .72(60)$

$78° + 33' + 43.2''$

$78° 33' 43''$

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