Math 3

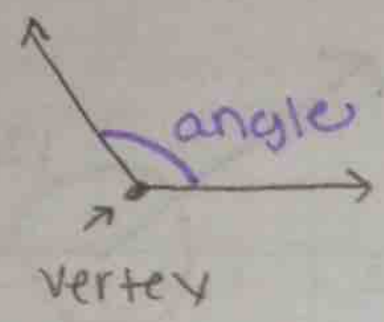
7.2 Angles, Coterminal Angles, and Reference Angles

Unit 7

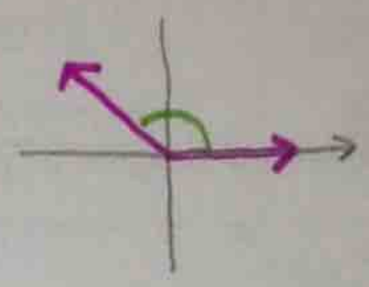
SWBAT draw positive and negative angles on the coordinate plane and determine conterminal and reference angles.

Important Vocabulary

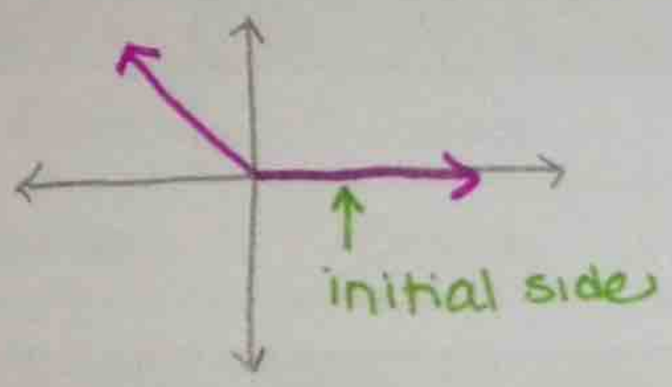
Angle: Formed by two rays with the same endpoint
Vertex: The endpoint of an angle



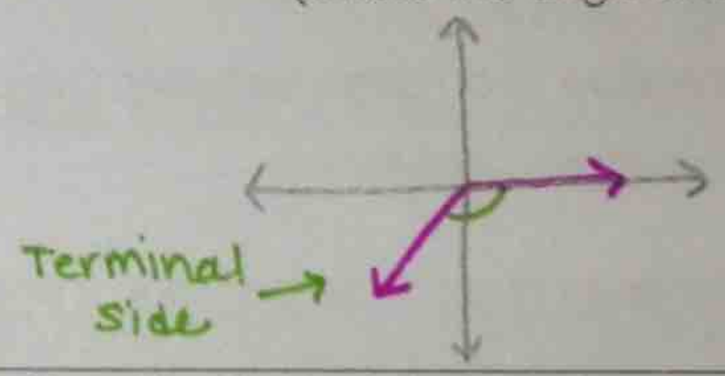
Standard Position: When the vertex of an angle is at the origin of the coordinate plane and one ray is on the positive x-axis



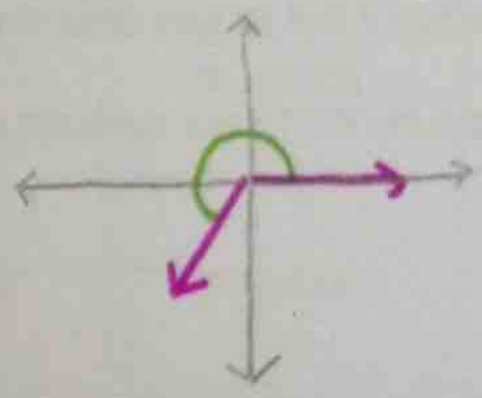
Initial Side: The ray of an angle found on the positive x-axis when the angle is in standard position



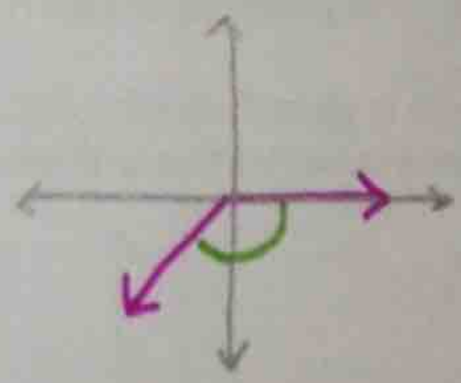
Terminal Side: The ray of an angle not found on the positive x-axis when the angle is in standard position (where the angle ends)



Positive Angles: Angles with degrees greater than 0 (counterclockwise)

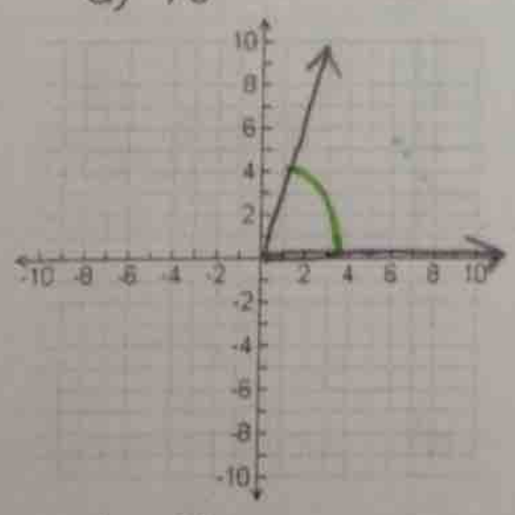


Negative Angles: Angles with degrees less than o (clockwise)

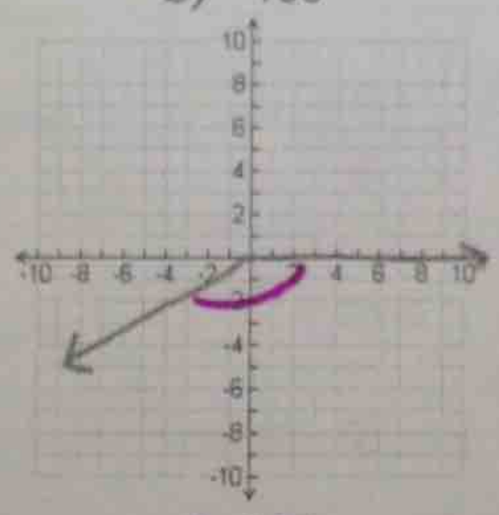


Example 1: Draw an angle with the given measure in standard position.

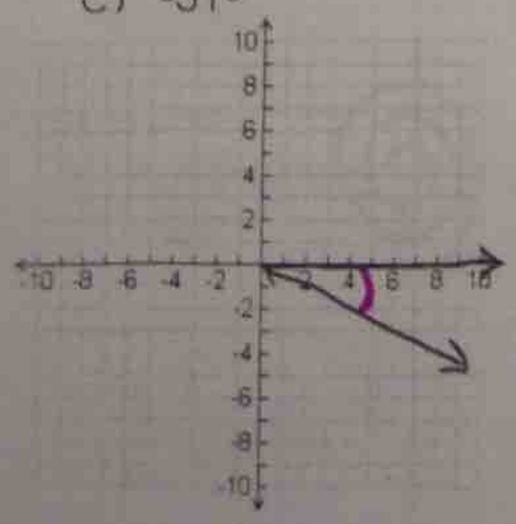
a) 70°



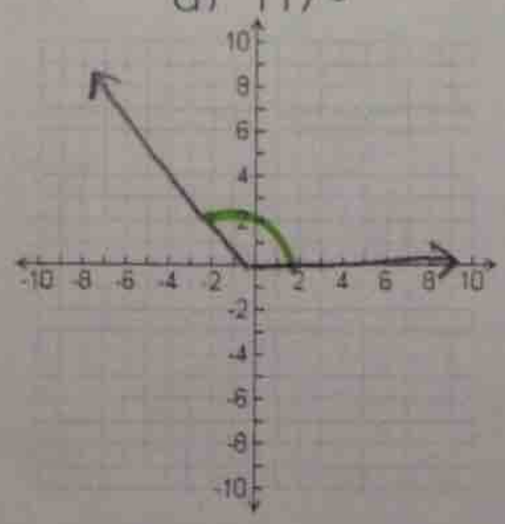
b) -135°

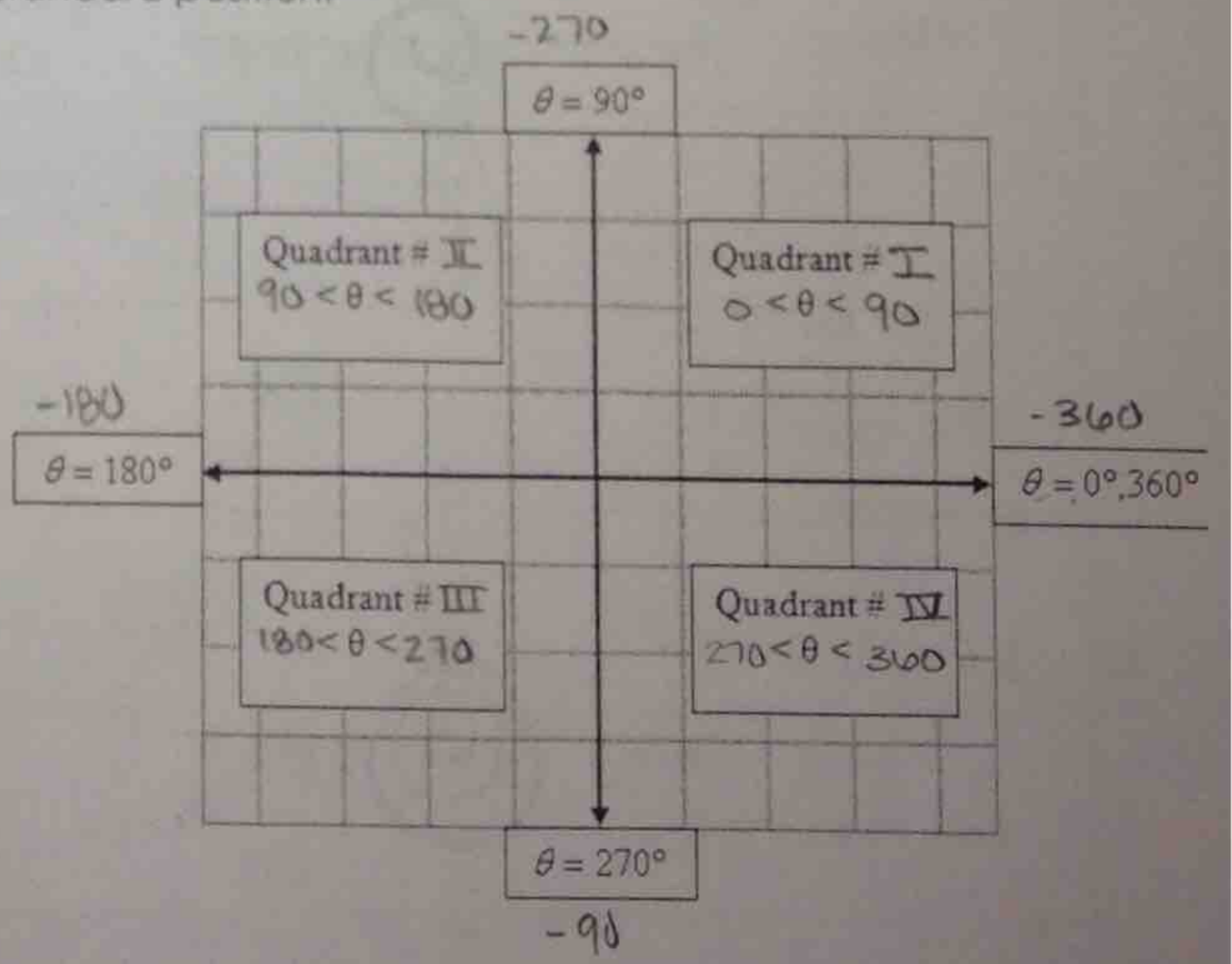


c) -31°



d) 117°





Coterminal Angles: Two angles in standard position that share the same terminal side

- To find **positive** coterminal angles: add 360° to the ≠ measure given
- To find **negative** coterminal angles: subtract 360° to the ≠ measure given

Example 2: Find the measure of a coterminal angle with the listed angle.

a) Find two positive coterminal angles with -410°

310°, 670°

b) Find two negative coterminal angles 579°

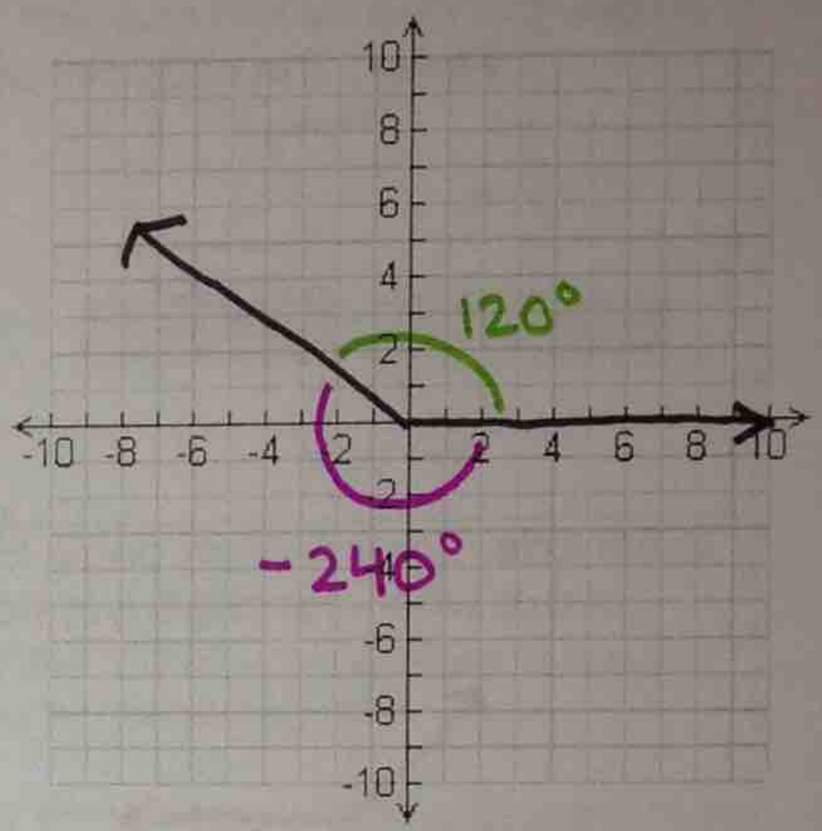
-141°, -501°

c) Find one positive and one negative coterminal angles with 227°

587°, -133°

d) Find the measure of an angle between 0 and 360° with -321°

39°



e) Find the measure of an angle between 0 and 360° with 1054°

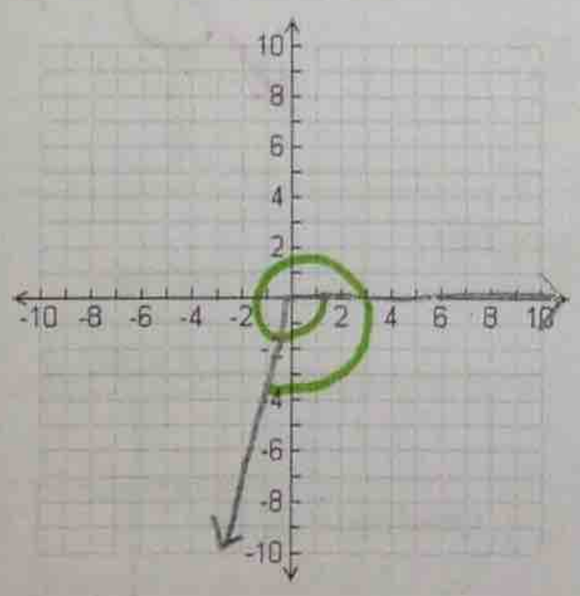
334°

Reference Angle: The positive angle measure created with the terminal side of the angle and the x-axis.

Example 3: Sketch a graph each of the following in standard position. Be sure that your swoosh marks match the number of turns around the unit circle. Then, find the reference angle.

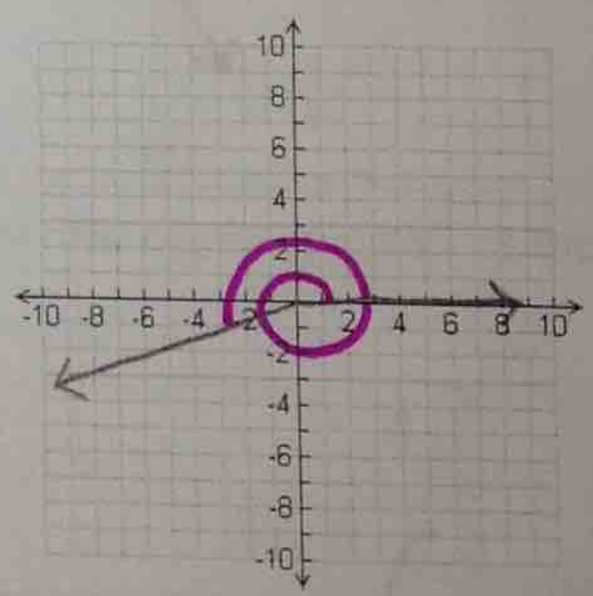
a) -460°

CT = 260°



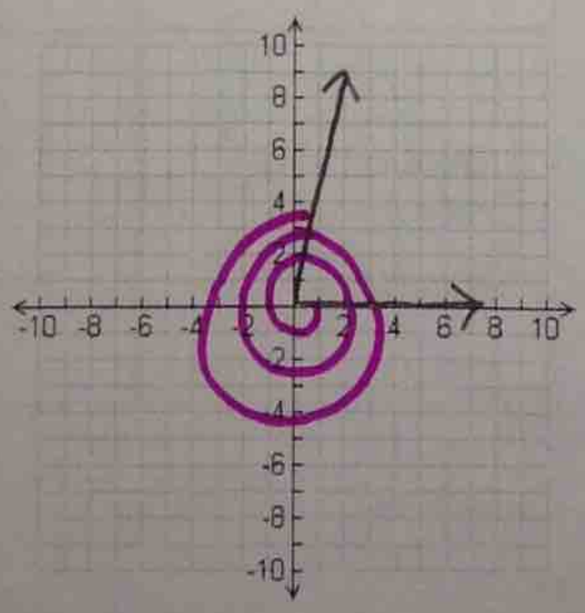
b) 553°

CT = 193°



c) -1000°

CT = 80°



d) 1000°

CT = 280°