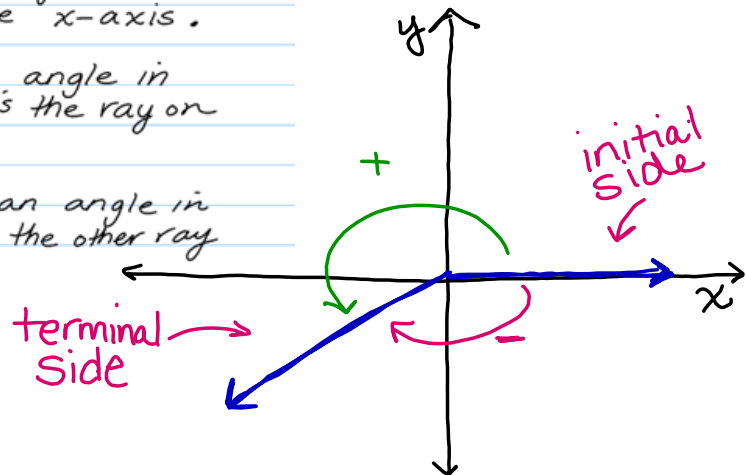


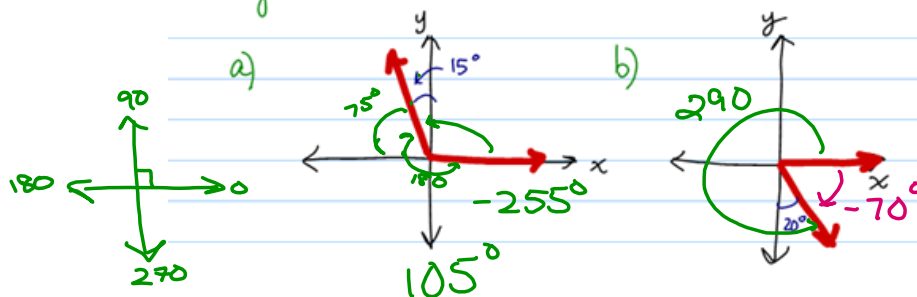
Angles in Standard Position

- An angle is in standard position when the vertex is at the origin and one ray is on the positive x -axis.
- The initial side of an angle in standard position is the ray on the x -axis.
- The terminal side of an angle in standard position is the other ray.



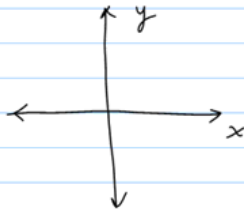
counterclockwise is positive clockwise is negative

Example 1: Find the measure of the angles below.

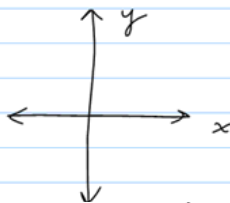


Example 2: Sketch the angles in standard position

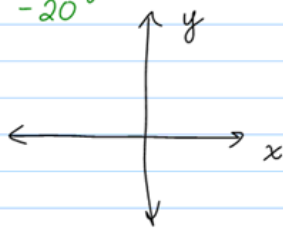
a) 68°



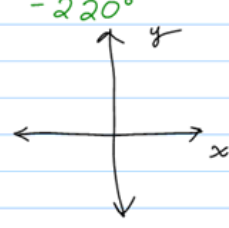
b) 280°



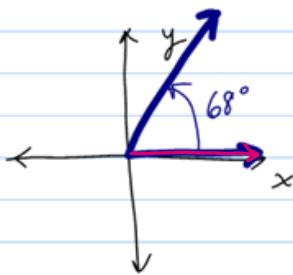
c) -20°



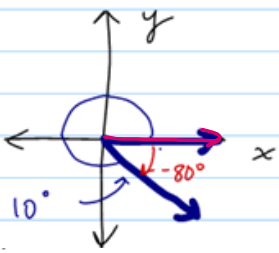
d) -220°



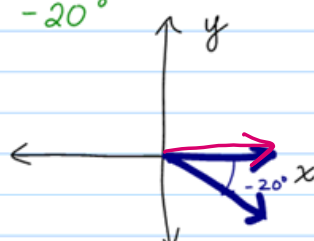
a) 68°



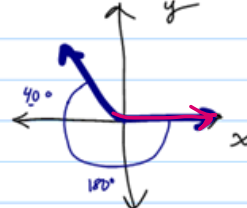
b) 280°

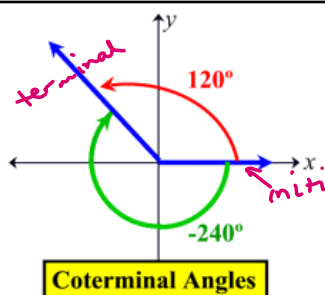


c) -20°



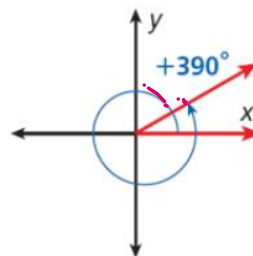
d) -220°





If two angles in standard position have the same terminal side, they are called **coterminal** angles. In the diagram at the left, $+120^\circ$ and -240° are coterminal angles.

Angles can rotate around the axis more than once.



There are infinitely many coterminal angles. To find the measure of an angle that is coterminal with an angle θ is to add or subtract integer multiples of 360.

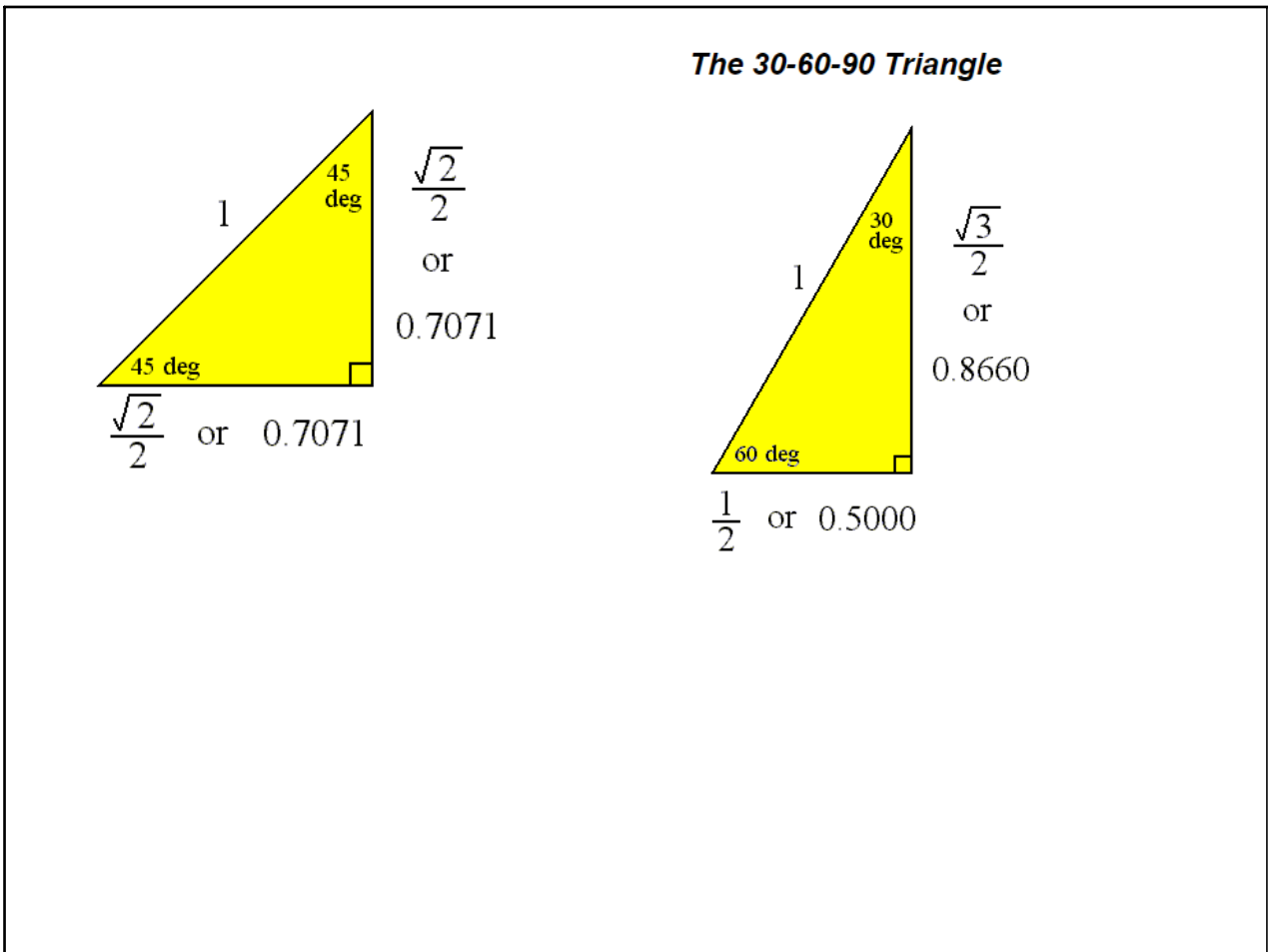
Find the measures of a positive angle and a negative angle that are coterminal with each given angle.

$$\theta = 65^\circ$$

$$65^\circ + 360^\circ = 425^\circ \quad \text{Add } 360^\circ \text{ to find a positive coterminal angle.}$$

$$65^\circ - 360^\circ = -295^\circ \quad \text{Subtract } 360^\circ \text{ to find a negative coterminal angle.}$$

Angles that measure 425° and -295° are coterminal with a 65° angle.



Conversion of Radians and Degrees

Degree \Rightarrow Radian multiply by $\left(\frac{\pi}{180^\circ}\right)$

Radians \Rightarrow Degrees multiply by $\left(\frac{180^\circ}{\pi}\right)$

Example 1 Converting from Degrees to Radians

[A] $\frac{60^\circ}{1} \cdot \frac{\pi}{180} = \frac{\pi}{3}$ [B] $\frac{30^\circ}{1} \cdot \frac{\pi}{180} = \frac{\pi}{6}$

Example 2 Converting from Radians to Degrees

[A] $-\frac{7\pi}{4} \cdot \frac{180}{\pi} = -315$ [B] $\frac{5\pi}{3}$

Page 644

1-21