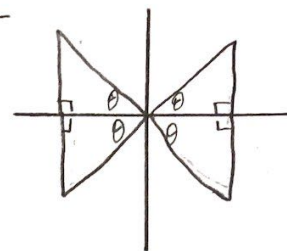
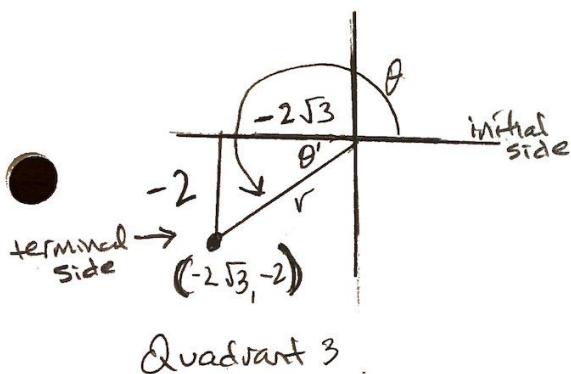


Bow Tie



Warmup #1: Review

The terminal side of θ passes through $(-2\sqrt{3}, -2)$, find r and θ (in degrees).



* Use Pythagorean theorem to find r

$$a^2 + b^2 = c^2$$

$$(-2\sqrt{3})^2 + (-2)^2 = c^2$$

$$12 + 4 = c^2$$

$$16 = c^2$$

$$c = 4 \Rightarrow \boxed{\text{radius} = 4}$$

* use tangent = $\frac{\text{opposite}}{\text{adjacent}}$ to find θ'

$$\tan \theta' = \frac{-2}{-2\sqrt{3}} = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

① using unit circle

$$\tan \theta' = \frac{\sqrt{3}}{3} \text{ in Quadrant 3}$$

$$\boxed{\theta = 210^\circ}$$

② using inverse tan

$$\theta' = \tan^{-1} \frac{\sqrt{3}}{3}$$

$$\theta' = 30^\circ$$

$$\theta = 180^\circ + 30^\circ$$

$$\boxed{\theta = 210^\circ}$$