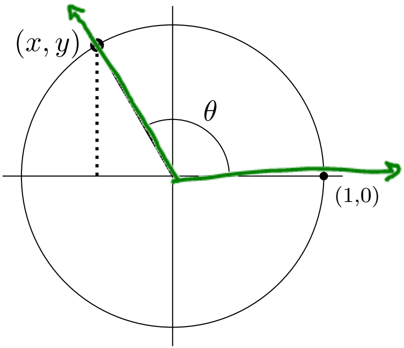
Sine and Cosine of Any Angle

Remember that $\sin(\theta)$ and $\cos(\theta)$ are defined using the unit circle.



$\sin(\theta)$ is the y-coordinate

$\cos(\theta)$ is the x-coordinate

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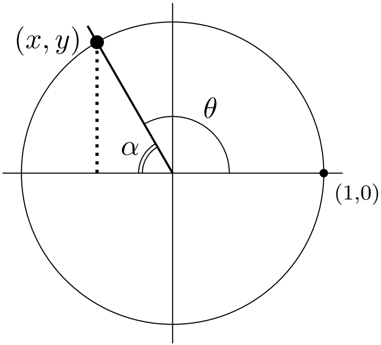


To compute $\sin(\theta)$ and $\cos(\theta)$, find

1. the angle's quadrant

   Graph the $\measuredangle$

   x, y positive or neg?

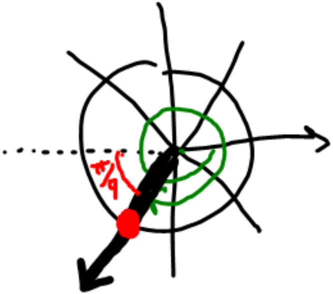
2. the triangle side lengths

   using the interior

   $\measuredangle\,\alpha$

E.g. Compute $\sin\left(\frac{-11\pi}{4}\right) = - \frac{\sqrt{2}}{2}$

$-11 \cdot \frac{\pi}{4}$



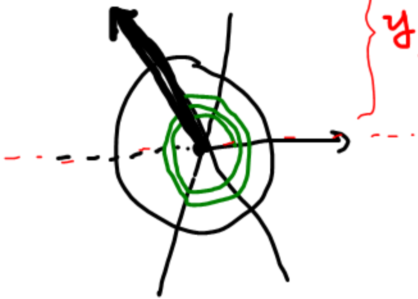
sin is neg

interior ∡ is $\pi/4$

$\sin(\pi/4) = \frac{\sqrt{2}}{2}$

E.g. Compute $\sin\left(\frac{14\pi}{3}\right) = + \frac{\sqrt{3}}{2}$

$14 \cdot \pi/3$



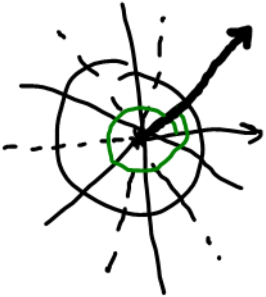
y-coord is pos

interior ∡ $\pi/3$

$\sin(\pi/3) = \frac{\sqrt{3}}{2}$

E.g. Compute $\sin\left(\frac{13\pi}{6}\right) = + \frac{1}{2}$

$13 \cdot \pi/6$



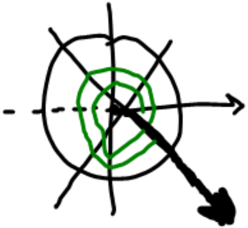
y-coord is pos

interior $\measuredangle = \frac{\pi}{6}$

$\sin(\pi/6) = \frac{1}{2}$

E.g. Compute $\cos\left(\frac{15\pi}{4}\right) = + \frac{\sqrt{2}}{2}$

$15 \cdot \frac{\pi}{4}$



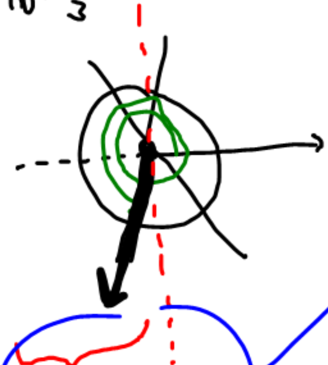
x-coord is pos

interior $\measuredangle = \pi/4$

$\cos\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}$

E.g. Compute $\cos\left(\frac{10\pi}{3}\right) = -\frac{1}{2}$

$10 \cdot \frac{\pi}{3}$



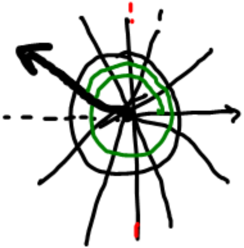
x-coord is neg

interior $\measuredangle = \frac{\pi}{3}$

$\cos\left(\frac{\pi}{3}\right) = \frac{1}{2}$

E.g. Compute $\cos\left(\frac{17\pi}{6}\right) = -\frac{\sqrt{3}}{2}$

$17 \cdot \pi/6$



x-coord is neg

interior ∡ $\pi/6$

$\cos(\pi/6) = \frac{\sqrt{3}}{2}$