

# $\pi$

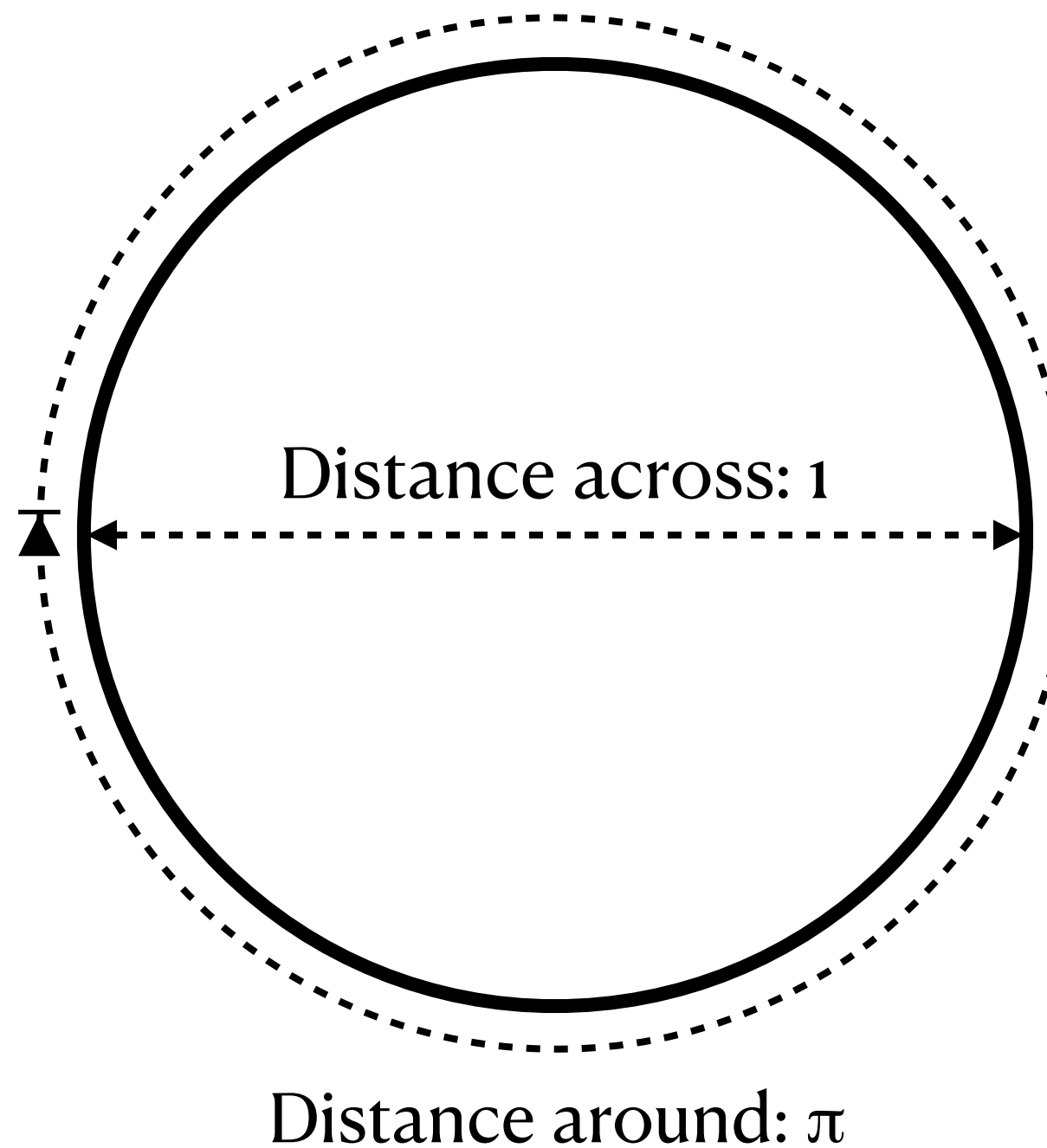
## The crowd favorite

it's the ratio of a circle's circumference  
to its diameter... *any* circle

timeless classics of grade school:

$$\text{circumference } C = 2\pi r$$

$$\text{area } A = \pi r^2$$



$\pi$  is about circles, pies are circular,  
what's not to like

3.14159 and so forth

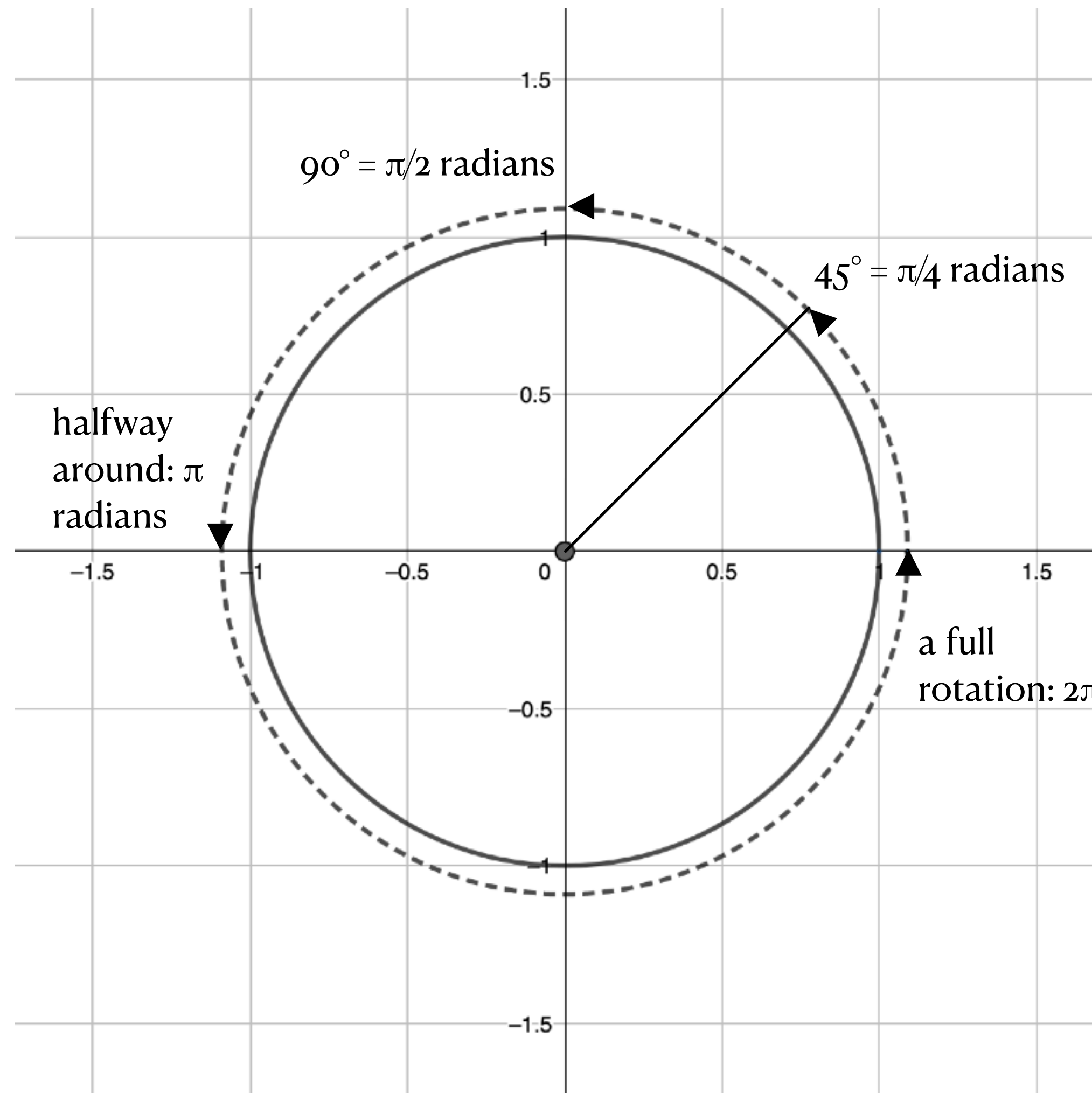
some people like to memorize hella digits of pi but [to paraphrase NASA](#), 39 or 40 digits is enough to calculate the circumference of the known universe (whose radius is about 46 billion light years) with an error no greater than the diameter of a hydrogen atom

# Radians: A Refresher

using  $\pi$  to measure angles

this is the "unit circle" because it  
has a radius of 1

the diameter is 2, so the  
circumference is  $2\pi$



you can express angles in terms  
of how far around the unit circle  
you are, starting on the right  
(the x axis)

so "all the way around," i.e. 360  
degrees, is  $2\pi$  radians, and  
smaller angles are some  
proportion of  $2\pi$