

# Happy Pi Day! $\pi$



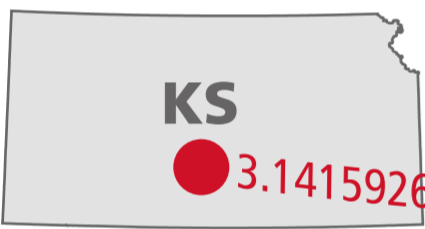
March 14

March 14th marks Pi Day (or  $\pi$  Day).

What are we celebrating anyway?

**PI IS THE RATIO OF THE CIRCUMFERENCE OF A CIRCLE TO THE DIAMETER.**

It starts with 3.14  
(hence the March 14th celebration!)  
– but goes on and on.



KS

3.1415926535897932384626433832795028841971693993751058209749445923078164062862089986280348253421170679...

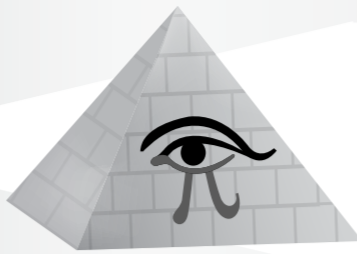


NY

**In fact,** if you were to print a billion decimal values of pi in 12-point font, it would stretch from Kansas to New York City.

## WHERE DID $\pi$ COME FROM?

~2000 B.C.



▶ The earliest written approximations of pi were found in Egypt and Babylon; both cultures knew that the value was greater than three

200 B.C.



▶ The ancient Greek mathematician Archimedes discovered the first three digits of pi, 3.14, through a geometrical approach using polygons

1706 A.D.



▶ English mathematician William Jones first introduced the symbol for pi and wrote:  $3.14159 = \pi$

1900 A.D.



▶ By the start of the 20th century, about 500 digits of pi were known

TODAY



▶ Today, thanks to computers, we now know more than the first 10 TRILLION digits of pi

## HOW IS $\pi$ USED IN THE REAL WORLD?



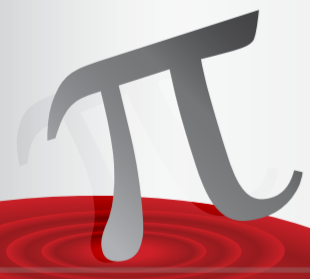
▶ When planes fly great distances, they are flying on an **ARC OF A CIRCLE** (the Earth). To gauge flight time, fuel use, etc., **AVIATION EXPERTS** need to accurately **CALCULATE THAT PATH**  $\pm$  using pi



▶ Biochemists use pi when trying to understand the **STRUCTURE/FUNCTION OF DNA**



▶ Statisticians use pi to track **POPULATION DYNAMICS**



▶ Physicists looking into the behavior of **FLUID RIPPLES** see pi and use it in their calculations



▶ Global Positioning Systems (GPS) use pi to **CALCULATE A SPECIFIC LOCATION** on Earth



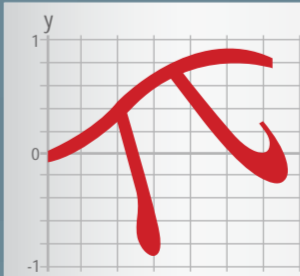
▶ Aircraft designers use pi to calculate areas of the **SKIN OF AN AIRCRAFT**



▶ Electrical engineers use pi to solve problems for **ELECTRICAL APPLICATIONS**



▶ Clock designers use pi when designing **PENDULUMS FOR CLOCKS**



▶ **SIGNAL PROCESSING AND SPECTRUM ANALYSIS** (identifying frequencies in a wave) use pi, as the fundamental period of a sine wave is  $2 * \pi$