

Helping Kids Learn - Post \#26 3/12/24 In honor of Pi ( $\pi$, Pie) Day

## How to Remember $\pi$ (Pi)

The ratio of the circumference of a circle to its diameter is so useful and special it gets its own symbol: the Greek letter $\boldsymbol{\pi}(\mathrm{Pi})$. When we write the ratio as a decimal number, the digits after the decimal point apparently never form a repeating pattern. At least, nobody has found one for thousands of years. Mathematicians call any non-repeating number irrational, possibly because its non-repetition isn't well-behaved (rational).

Some clever person noticed that March $14^{\text {th }}$ could be written using the first three digits of $\pi$ as a decimal number: 3.14. Because we say $\pi$ like the English word "pie," March $14^{\text {th }}$ has been named Pi Day to celebrate $\pi$. Not much in math gets its own day - and a delicious one at that!

Because it is used a lot, it is handy to know the decimal approximation of $\pi$ instead of having to calculate it each time. Some people just have fun remembering as many digits of $\pi$ as they can.

## Investigation 1 - Pilish

Before, the $20^{\text {th }}$ century only about 200 digits of $\pi$ were known - and people could memorize that many. Modern computers calculated $\pi$ to many decimal places, exploding the memorization task. One way

The first 10 digits of $\pi$
3.141592653 people remember the digits is by creating Pilish: English phrases and sentences whose words have as many letters as the digits in $\pi$. Pilish is a portmanteau word - made of parts of two words stuck together pi- and -lish. (say $\pi$-lish).

For example, How, I said could represent 3.14.
Create a Pilish phrase or sentence that makes some sense and represents the first 5 digits of $\pi$.
3.1416 (rounded) or 3.1415 (not rounded)

Next, try the first 10 digits.

$$
3.141592653 \text { (two ways to round }- \text { the } 11^{\text {th }} \text { digit is } 5 \text { ) }
$$

## Investigation 2 - Piems

Piem is another portmanteau, this time of "pi" and "poem," pronounced pi-em. You guessed it - a piem is a poem in which the words have the number of letters corresponding to the digits in $\pi$.

Write a piem that has a theme (one subject) but doesn't necessarily rhyme. You decide how many words (digits of $\pi$ ).
$\square$
Now try one that rhymes!
$\square$

Try writing a piku - a piem in which the syllables match the digits in $\pi$. (Think about a haiku.)
$\square$
Or break new ground: try a rap or spoken word piem!

## Keep Learning

For more information, check some of these Online resources (up-to-date as of 3/24):

Pi https://en.wikipedia.org/wiki/Pi

Piphilology https://en.wikipedia.org/wiki/Piphilology

Pilish https://www.bbc.com/future/article/20160311-how-the-number-pi-inspired-a-writingstyle (requires free registration on the BBC website);
https://www.npr.org/sections/bryantpark/2008/03/a challenge for pi day write y.html; http://www.cadaeic.net/pilish.htm;
https://www.valhallaconsulting.com.au/PilishChecker.html

Transcendent Number $\pi$ is also a transcendent number - it is not the solution of any nonconstant rational polynomial
https://en.wikipedia.org/wiki/Lindemann\�\�\�Weierstrass theorem

## NJ Student Learning Standards

ELA: RL.5.4, RL.5.9, NJSLSA.W10. NJSLSA.L1, NJSLSA.L4; NJSLSA.W.5, W.8.2; W.9-10.4.D; W.1112.3.D

Mathematics: 8.NS.A.1, 8.NS.A.2, 8.G.C; HS.G.C.A., HS.G.GPE, HS.G.MG.A. 1

