Date: _____

Word hunt: 3.14 essential reads about π for Pi Day

Read the article on the next pages. When you find a word from the word bank, **circle it in the article**, then check its box here. The words are listed in the order they first appear.

☐ **Pi**
The number you get when you divide any circle's circumference by its diameter. It is a little more than 3, and its digits never end.

☐ **Pi Day**
A holiday on March 14, or 3/14, when people celebrate pi because the date matches its first digits.

☐ **Symbol**
A mark that stands for an idea. The Greek letter π is the symbol for pi.

☐ **Irrational number**
A number whose digits go on forever without settling into a repeating pattern, so it cannot be written exactly as a fraction of two whole numbers.

☐ **Ratio**
A comparison of two amounts by dividing one by the other. Pi is the ratio of a circle's circumference to its diameter.

☐ **Circumference**
The distance all the way around a circle.

☐ **Diameter**
The distance straight across a circle, through its center.

☐ **Probability**
A number that tells how likely something is to happen.

☐ **Probability distribution**
A rule that shows how likely each possible result is. Article 1 says the most common one in the real world has pi hiding inside it.

☐ **Area**
The amount of flat space inside a shape, measured in square units.

☐ **Approximation**
A value that is close to the true answer but not exact. An estimate is a kind of approximation.

This sheet was written by This Month. It is not part of the article. The article starts on the next page and has not been changed.

3.14 essential reads about π for Pi Day

By Jeff Inglis, *The Conversation*

Originally published in **The Conversation**:
https://theconversation.com/3-14-essential-reads-about-for-pi-day-74022
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Editor's note: The following is a roundup of archival stories.

On March 14, or 3/14, mathematicians and other obscure-holiday aficionados celebrate Pi Day, honoring π, the Greek symbol representing an irrational number that begins with 3.14. Pi, as schoolteachers everywhere repeat, represents the ratio of a circle's circumference to its diameter.

What is Pi Day, and what, really, do we know about π anyway? Here are three-and-bit-more articles to round out your Pi Day festivities.

A silly holiday

First off, a reflection on this "holiday" construct. Pi itself is very important, writes mathematics professor Daniel Ullman of George Washington University, but celebrating it is absurd:

> The Gregorian calendar, the decimal system, the Greek alphabet, and pies are relatively modern, human-made inventions, chosen arbitrarily among many equivalent choices. Of course a mood-boosting piece of lemon meringue could be just what many math lovers need in the middle of March at the end of a long winter. But there's an element of absurdity to celebrating π by noting its connections with these ephemera, which have themselves no connection to π at all, just as absurd as it would be to celebrate Earth Day by eating foods that start with the letter "E."

And yet, here we are, looking at the calendar and getting goofily giddy about the sequence of numbers it shows us.

There’s never enough

In fact, as Jon Borwein of the University of Newcastle and David H. Bailey of the University of California, Davis, document, π is having a sustained cultural moment, popping up in literature, film and song:

> Sometimes the attention given to pi is annoying. On 14 August 2012, the U.S. Census Office announced the population of the country had passed exactly 314,159,265. Such precision was, of course, completely unwarranted. But sometimes the attention is breathtakingly pleasurable.

Come to think of it, pi can indeed be a source of great pleasure. Apple’s always comforting, and cherry packs a tart pop. Chocolate cream, though, might just be where it’s at.

Strange connections

Of course π appears in all kinds of places that relate to circles. But it crops up in other places, too – often where circles are hiding in plain sight. Lorenzo Sadun, a professor of mathematics at the University of Texas at Austin, explores surprising appearances:

> Pi also crops up in probability. The function $f(x)=e^{-x^2}$, where e=2.71828… is Euler’s number, describes the most common probability distribution seen in the real world, governing everything from SAT scores to locations of darts thrown at a target. The area under this curve is exactly the square root of π.

It’s enough to make your head spin.

Historical pi

If you want to engage with π more directly, follow the lead of Georgia State University mathematician Xiaojing Ye, whose guide starts thousands of years ago:

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Original article: theconversation.com/3-14-essential-reads-about-for-pi-day-74022

> The earliest written approximations of pi are 3.125 in Babylon (1900-1600 B.C.) and 3.1605 in ancient Egypt (1650 B.C.). Both approximations start with 3.1 – pretty close to the actual value, but still relatively far off.

By the end of his article, you'll find a method to calculate π for yourself. You can even try it at home!

An irrational bonus

And because π is irrational, we'll irrationally give you even one more, from education professor Gareth Ffowc Roberts at Bangor University in Wales, who highlights the very humble beginnings of the symbol π:

> After attending a charity school, William Jones of the parish of Llanfihangel Tre'r Beirdd landed a job as a merchant's accountant and then as a maths teacher on a warship, before publishing A New Compendium of the Whole Art of Navigation, his first book in 1702 on the mathematics of navigation. On his return to Britain he began to teach maths in London, possibly starting by holding classes in coffee shops for a small fee.

> Shortly afterwards he published "Synopsis palmariorum matheseos," a summary of the current state of the art developments in mathematics which reflected his own particular interests. In it is the first recorded use of the symbol π as the number that gives the ratio of a circle's circumference to its diameter.

What made him realize that this ratio needed a symbol to represent a numeric value? And why did he choose π? It's all Greek to us.

Jeff Inglis, Environment + Energy Editor, *The Conversation*

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Date: _____

Timeline: from Babylon to Pi Day

Use the article to fill in each blank. Choose from the word bank, and cross out each word as you use it. The facts on this timeline all come from the article you just read.

Word bank

Pi	**Egypt**	**1702**	**314,159,265**
Babylon	**π**	**3.1605**	**navigation**

1900–1600 B.C.	The people of (1) _____ write down 3.125 as an approximation of pi.
1650 B.C.	The people of ancient (2) _____ write down the approximation (3) _____.
(4) _____	William Jones publishes his first book, on the mathematics of (5) _____.
Shortly afterwards	Jones publishes “Synopsis palmariorum matheseos.” It has the first recorded use of the symbol (6) _____ for the ratio of a circle’s circumference to its diameter.
14 August 2012	The U.S. Census Office announces that the population of the country has passed exactly (7) _____.
March 14, or 3/14, every year	People celebrate (8) _____ Day.

Do the math. About how many years passed between 1650 B.C. and A.D. 1702? _____ years

How many years passed between 1702 and 2012? _____ years