Pi: What comes next?

G'Day!

This is your math friend James. Today I am answering a question from Naren.

Pi is puzzling. Where did pi come from?

The number pi is indeed puzzling. And it has puzzled mathematical thinkers throughout the ages - and it still puzzles people to the present! (That's a lot of Ps.)

So, where did pi come from?

It came from thinking about and measuring lengths in basic shapes from geometry. For example, consider a square.
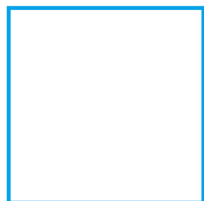
What might you measure in a square? It's width, perhaps. It's height, too. (But a square has height the same as its width, so that's not really measuring anything new.) You could also wrap a string once around the square and measure the length of the string. This length is called the perimeter of the square.

If you do this for a lot of squares, you will notice that the perimeter of a square is always 4 times its width. (Perhaps you can see why.)
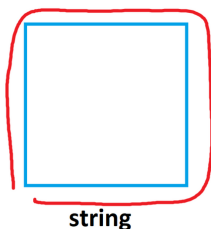
string

What's another basic shape in geometry? A circle.

width

string

circumference

height
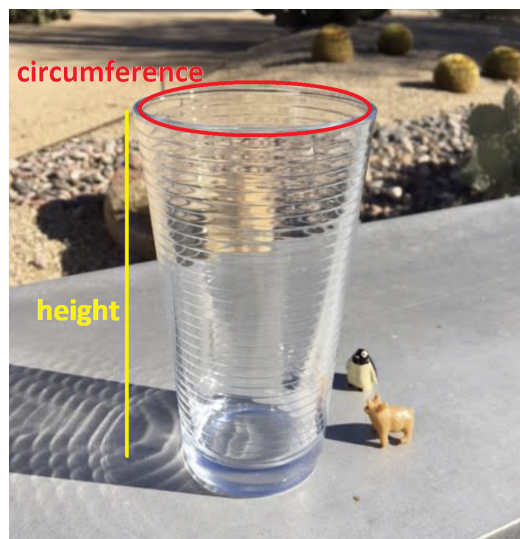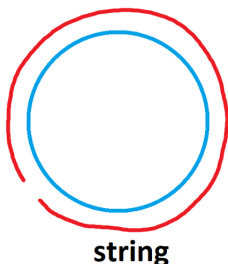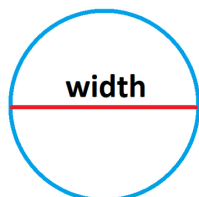
If you measure its width and if you wrap a string around it and measure its perimeter, you will find that the perimeter always seems to be seems to be a bit more than 3 times its width. (For some reason, people prefer to use the word circumference instead of perimeter for circles.)

Try it! Find the lid of a jar or a plate or a flower pot. Wrap a string around the circle and see that the length of your string is a bit more than three times the width of your circle.

The circumference of a circle is always about three-and-a-tenth times as long as its width. Actually, make that three-and-fourteen-hundredths times as along. No, actually,

puzzle #1

Measure the height of a drinking glass and measure the circumference of the glass.

Can you find a glass with height measurement a bigger number than its circumference measurement?

make that three-and-one-hundred-and-forty-one thousands times as along. And so on we can go!

For well over two thousand years people wanted to know the exact number. Exactly how many times as long is the circumference of a circle compared to its width? And no one knew!

People called this special number — whatever its value happens to be — special names. In the 1700s, European mathematicians started calling it "pi" for the Greek letter π, and that name has stuck.

Then, round the year 1761, Swiss mathematician Johann Lambert proved something astounding. He proved that pi is sure to have a decimal expansion that goes on forever, without an obvious pattern to its digits. That is, he prove that no one can truly know pi!

Whoa!

Here are the first 500 decimal digits of pi. Do you see any patterns?

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3 . 1 4 1 5 9 2 6 5 3 5 8 9 7 9 3 2 3 8 4 6 2 6 4 3 3 8
3 2 7 9 5 0 2 8 8 4 1 9 7 1 6 9 3 9 9 3 7 5 1 0 5 8 2 0
9 7 4 9 4 4 5 9 2 3 0 7 8 1 6 4 0 6 2 8 6 2 0 8 9 9 8 6
2 8 0 3 4 8 2 5 3 4 2 1 1 7 0 6 7 9 8 2 1 4 8 0 8 6 5 1
3 2 8 2 3 0 6 6 4 7 0 9 3 8 4 4 6 0 9 5 5 0 5 8 2 2 3 1
7 2 5 3 5 9 4 0 8 1 2 8 4 8 1 1 1 7 4 5 0 2 8 4 1 0 2 7
0 1 9 3 8 5 2 1 1 0 5 5 5 9 6 4 4 6 2 2 9 4 8 9 5 4 9 3
0 3 8 1 9 6 4 4 2 8 8 1 0 9 7 5 6 6 5 9 3 3 4 4 6 1 2 8
4 7 5 6 4 8 2 3 3 7 8 6 7 8 3 1 6 5 2 7 1 2 0 1 9 0 9 1
4 5 6 4 8 5 6 6 9 2 3 4 6 0 3 4 8 6 1 0 4 5 4 3 2 6 6 4
8 2 1 3 3 9 3 6 0 7 2 6 0 2 4 9 1 4 1 2 7 3 7 2 4 5 8 7
0 0 6 6 0 6 3 1 5 5 8 8 1 7 4 8 8 1 5 2 0 9 2 0 9 6 2 8
2 9 2 5 4 0 9 1 7 1 5 3 6 4 3 6 7 8 9 2 5 9 0 3 6 0 0 1
1 3 3 0 5 3 0 5 4 8 8 2 0 4 6 6 5 2 1 3 8 4 1 4 6 9 5 1
9 4 1 5 1 1 6 0 9 4 3 3 0 5 7 2 7 0 3 6 5 7 5 9 5 9 1 9
5 3 0 9 2 1 8 6 1 1 7 3 8 1 9 3 2 6 1 1 7 9 3 1 0 5 1 1
8 5 4 8 0 7 4 4 6 2 3 7 9 9 6 2 7 4 9 5 6 7 3 5 1 8 8 5
7 5 2 7 2 4 8 9 1 2 2 7 9 3 8 1 8 3 0 1 1 9 4 9 1 2
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In the end, pi truly is puzzling.

Do you have a math question for me to answer, or try to answer?

Write to me **at the website**. Each week I'll pick a new question and give my thoughts on it!

puzzle #2

The value of pi for a circle is the tricky number 3.141592.... .

The value of pi for a square is 4.

Is there a value of pi for a regular hexagon?

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