

The Secret of Every Circle

A math mystery you can solve with a piece of string

Find something round: a can, a plate, a jar lid, a coin. Any circle will do!
Now grab a piece of string. You are about to discover something amazing
that is true for every circle in the whole universe.

Step 1

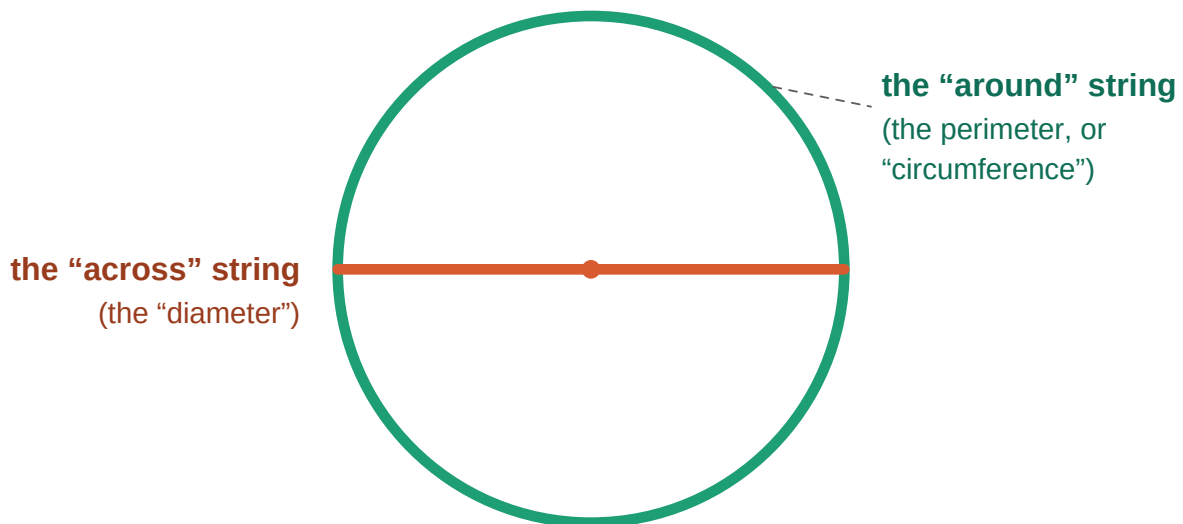
Wrap the string all the way AROUND your circle. Cut it. This is the “around” string.

Step 2

Cut another string that goes straight ACROSS the middle. This is the “across” string.

Step 3

Now compare! How many “across” strings does it take to be as long as the “around” string?

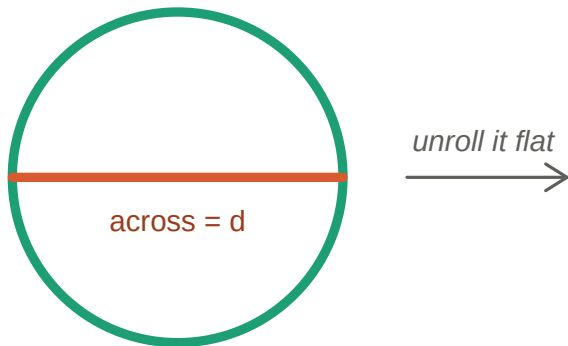


Make a guess before you turn the page: 2 strings? 3? 10?

Unroll It!

What happens when you lay the “around” string out flat

Here is the surprise: it takes a little more than 3 “across” strings to match the “around” string. Not exactly 3 — there is always a little bit left over.



the “around” string, laid out straight



That “3 and a little bit” is the same for EVERY circle!

Tiny coin or giant Ferris wheel — always about 3.14 across-strings.

This famous number is called pi, written with the symbol:

$$\pi \approx 3.14$$

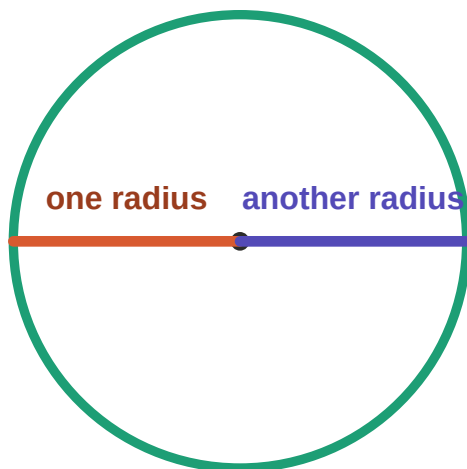
distance around = π × distance across

$$C = \pi \times d$$

So Where Does the 2 Come From?

Turning $\pi \times d$ into $2 \times \pi \times r$

Mathematicians like to measure circles from the CENTER. The distance from the center to the edge is called the radius (r). Look what happens:



Two radiuses, laid end to end, reach all the way across.

$$\text{So: } d = 2 \times r$$

Now swap it in:

$$C = \pi \times d \quad \text{and} \quad d = 2 \times r$$

$$C = 2 \times \pi \times r = 2\pi r$$

The 2 just means “it takes two radiuses to get across.”

Try it yourself!

Measure some round things at home and fill in the table. Divide the “around” number by the “across” number. What do you get every time?

Round thing	Around (cm)	Across (cm)	Around $\div$ Across
soup can	23.9	7.6	3.14 $\leftarrow$ hey!
	3		