

**ZMATH 2014e.00460**

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**Why isn't  $\pi$  a whole number?**

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From the text:  $\pi$  holds a magical fascination for pupils and teachers alike. I think that the way in which it is often introduced can be puzzling for pupils. They are told that it is 'the ratio of the circumference to the diameter of a circle', and they perhaps measure these values for several cylinders and divide them to obtain approximations for it. The irrational nature of  $\pi$  is usually defined by saying that it can't be expressed as 'one integer divided by another', but this can be quite confusing, because pupils may think that if  $\pi$  is not the ratio of two integers then it must be the ratio of two decimals. (They probably divided two decimal measurements to obtain their value for it when measuring their circular objects.) This is an example of where mathematicians' efficient language can be misleading. It is not just that  $\pi$  can't be expressed as the ratio of two integers; it can't be expressed as the ratio of any two rational numbers.

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