



# Schrödinger's other box paradox

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# You have choice of two boxes

- One contains  $x$ , the other  $2x$ , for some unknown  $x$
- All  $x$  equally probable
- Choose your box.
- Expected contents of the other box is  $\frac{1}{2} (x/2) + \frac{1}{2} (2x) = 5x/4$
- So you chose the wrong box
- You didn't even have to open the box to know you'd made the wrong choice!

# William Burnside's example

- What is the probability that a random integer is divisible by 7?
- Well, here is a list of all the integers:
- {1, 7, 2, 14, 3, 21, 4, 28, 5, 35, 6, 42, 8, 49, 9, 56, 10, 63, 11, 70, 12, 77, ...}
- So probability a random integer is divisible by 7 is obviously  $1/2$

# Moral

- Before making your choice, find out exactly how the random number was chosen!