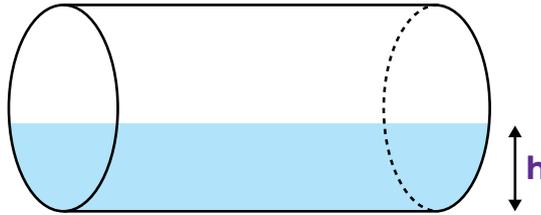


Maths Fest Puzzles



The Think Maths team also help out with Maths Fest, a one-day festival of maths for sixth formers and teachers (details at www.maths-fest.com). We put together a booklet with some puzzles for the day, and we thought we'd share some of them with you! Hints and solutions are available.

1. A cylindrical can containing some liquid is on its side on a table, with the surface of the liquid h above the table. How full is the can?



2. If a ball moving forward at 1 metre per second slows down by 50% every 5 seconds, how long does it take to stop, and what distance does it travel in total?

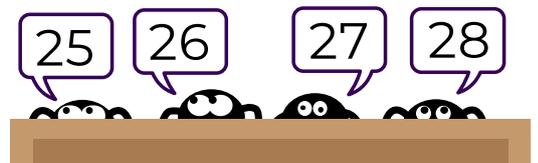


3. There are 26 coins lying on a table in a totally dark room. 10 are heads and 16 are tails. In the dark, you cannot feel or see if a coin is heads or tails up but you may move them or turn any of them over. Separate the coins into two groups so that each group has the same number of coins heads up as the other group.

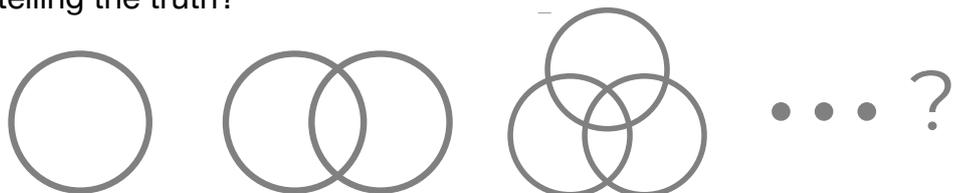
4. I shuffle a regular pack of cards (so of course half of them are black and half of them are red). I then deal four cards to you, and three cards to me. What is the probability that you have got more black cards in your hand than I have?



5. The president of the spiders has four servants, and the servants have either 6, 7 or 8 legs. Servants with 7 legs always lie, and servants with 6 or 8 legs always tell the truth. The president asks 'how many legs do you four have in total?', and the four spider servants (who are standing behind a table, so you can't see their legs) answer 25, 26, 27 and 28 respectively. Who is telling the truth?



6. How many regions can 4 circles divide a plane into?



1 circle: 2 regions (inside and outside) 2 circles: 4 regions 3 circles: 8 regions

7. Why are all four-digit palindrome numbers divisible by eleven?



8. Four numbered cards, each bearing a positive whole number, are placed face-down on the table. When three of these cards are turned over, the possible sums are 14, 16, 19 and 20. What are the numbers on the four cards?

