

DEAR Dr Maths,
My brother-in-law told me this brainteaser and I thought it was good, Can you work out the answer?

Take a glass of milk and a cup of black coffee. Transfer one spoonful of milk to the cup of coffee and stir. Then transfer one spoonful of this mixture back to the milk. The question being, is there now more milk in the coffee than coffee in the milk, or more coffee in the milk than milk in the coffee? Peter, Cramlington

This is a version of a very old mathematical puzzle and I can explain the answer to it by means of a card trick. The key to this brainteaser is



that by the end both the glass and the cup contain as much liquid as they did at the beginning. The same is also true in the following card trick. Take a normal pack of 52 cards and get a friend to firstly count out 22 cards. They then need to turn these 22 cards face up and mix them in with the 30 face down cards.

Next, without you looking, they count out 22 cards from the top of the pack and hand these to you.

You then say "I do not know how many reversed cards are in this group of 22 you have just given me, but it is likely to be less than in your 32. I will say the magic words "abracadabra" and then there will be exactly the same number of face up cards in both packs."

You then secretly turn your pack upside down and spread them out on the table. Ask your friend to lay out their 32 cards and, as if by magic, both will contain the same number of face up cards. So the answer to your

brainteaser Peter, is that there is the same amount of milk in the coffee, as coffee in the milk.

As in the card trick, the act of transferring face up cards to the 22, results in the same number of face down cards going to the hand containing 32.

I always enjoy receiving your puzzles and brainteasers, so please send in or email to me any you find interesting. Here is a puzzle for you to try:

Two sons took each of their dads to the pub for new year. The bill for the evening came to £112. One dad spent twice as much as the other, and the two sons total spend together was the same amount as one

of the dads. If each of them spent an exact whole number of pounds, how much did each son spend?

The first correct entry drawn will win a copy of The Times Sudoku book, which is also available from Waterstone's. Well done to Mr A Atherton, from Consett, County Durham, who correctly worked out from the last puzzle that the correct number of cannon balls in the pile was $1+4+9+16+25$, the first five square numbers, totalling 55. Do you have a maths question or problem? Write to Dr Maths, Evening Chronicle, Groat Market, Newcastle NE1 1ED, or email: DRMaths@hotmail.co.uk

