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THE DIFFY SQUARE CHALLENGE

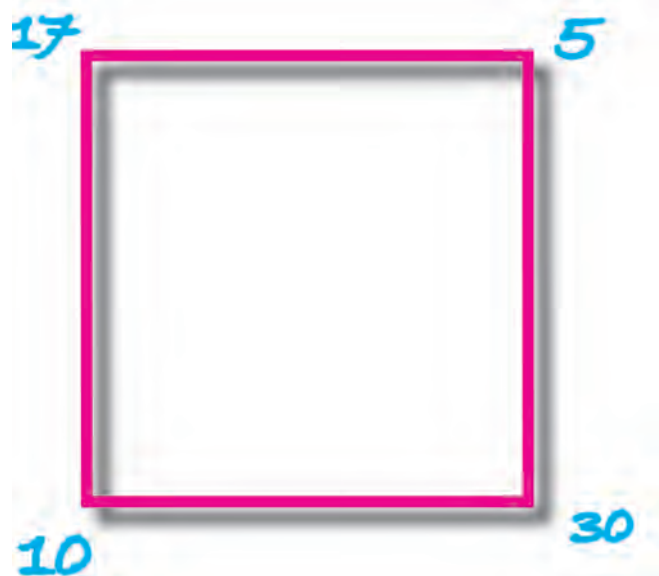
ROB EASTAWAY

Rob Eastaway is an author and speaker, well known for his work making maths accessible to children and adults. His bestselling books include *Maths for Mums and Dads* and *Why Do Buses Come in Threes?* His latest book is called *Any Ideas?* and is about how to think creatively.

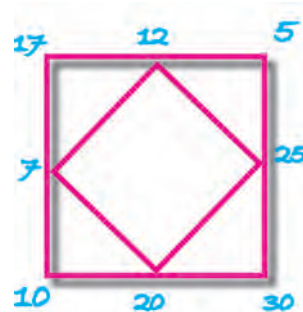
You can find out more about him at www.RobEastaway.com

Diffy squares are simple - and yet mysterious. Here's how to make a diffy square.

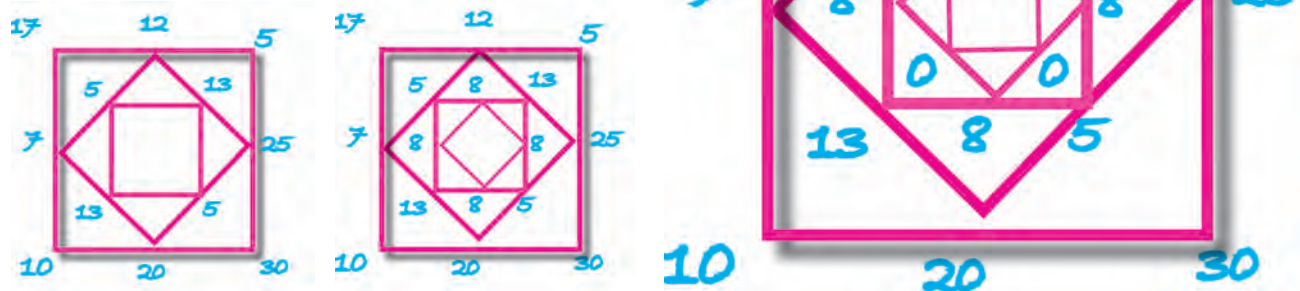
Draw a square, and then put four different numbers at the corners. For example:



Now find the difference between the numbers at the neighbouring corners and write the answer at the mid-point between them. For example $17-5=12$, so write 12 midway between 17 and 5. Join these mid-points to make a new square (which looks like a diamond), like this:



Next, find the differences between the corners of the square, and again put the answers at the mid-points and join them to make a square. Repeat this until you end up with a square in the middle that is all zeroes, like this:



In the example above, we created a total of five diffy squares if you include the first square and the final 'zero' square (count them to confirm that you agree).

YOUR CHALLENGES

1. Create your own starter square, putting four different numbers at the corners. Now 'Diffy' it. Check that you end with a zero square. (This is called 'getting Zeroed')
2. Can you find a combination of starting numbers that leads to MORE than five Diffy Squares?
3. What happens if you don't choose whole numbers (for example decimals - or even pi)? Does this create more Diffy Squares before you get Zeroed?

ULTRA-CHALLENGE

In the ultra-challenge you are only allowed to use whole numbers between 1 and 50. Can you find a combination of numbers that creates TEN Diffy squares?

GENIUS-CHALLENGE

Can you find the combination of four whole numbers between 1 and 50 that creates thirteen Diffy Squares? (There may only be one combination that works - if you can find more than one combination, give yourself extra genius points).