

Ronik Popli (Wilson's School) - Dozens - Nrich - 25/04/2021

The divisibility rule of 2 is very simple - the number must be an even number and to check that a number is a multiple of 2, the number must end in a 0, 2, 4, 6, 8.

The divisibility rule of 3 is to add up all the digits in the number and check whether the sum is divisible by 3. ~~if it is divisible~~.

The divisibility rule of 4 is that if the number created by the last two digits is divisible by 4, then so is the number.

For a number to be divisible by 5, it must end in a 5 or a 0.

The divisibility rule of 12 is that the number must be divisible by 3 and 4.

The divisibility rule of 15 is for it to be divisible by 3 and 5.

For the divisibility rule of 25, the two last digits must be either 00, 25, 50 or 75.

My strategy to ensure that my first "guess" is correct is to use the divisibility rules. For example, in the divisibility rule of 2, the digit has to end in an even number so I try to get the highest even digits available. I also know that to make the number big, I need some '9's'. Once I have done that, I form my number, I can use the appropriate divisibility rules to help me solve this problem with any settings.

To find the largest possible five-digit number divisible by 12 that I can make from the digits 1, 3, 4, 5 and one more digit, I have to put ~~4 in the units column~~ an even number in the units column to meet the divisibility rule of 12. The number also has to be divisible by 3 so the only additional numbers ^{that can be added} are 8, 5 or 2. If I add 8, the largest number that can be made is 53184. When 5 is added, there are no possible combinations. When 2 is added, the largest possible number is 54312. 54312 is the largest number.