Extra challenge!

If you finish your questions today (10.02.21) or tomorrow (11.02.21) and you still have some time left within your maths hour, you could have a go at this extra challenge! The answers will be shared tomorrow. Try to consider how your knowledge of multiplication can help you, rather than relying solely on a 'trial and error' approach.

Power play

Here is a part of a 100 square.

21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

I multiplied three numbers from the same column. My answer was 46,953.

Lexi

I multiplied three numbers from the same column and my answer ended in a 2.

Mo

I multiplied three consecutive numbers and got 21,924.

Zac

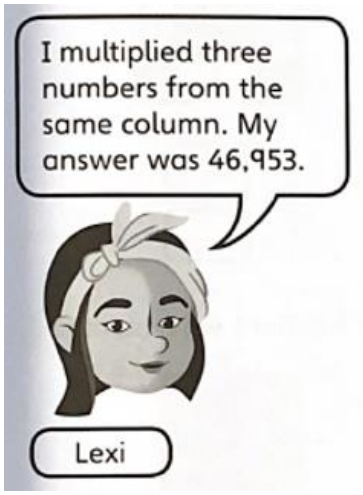
a) Which three numbers did Lexi multiply together?

b) What were the numbers that Mo multiplied together? What was the answer that Mo got?

c) What numbers did Zac multiply together?

If you multiply any three consecutive numbers the answer will always end in 0, 4 or 6. True or False?

When I was approaching these questions, I find it really useful to firstly use my knowledge of multiplication to identify what I knew the answer for each section **wasn't** before I considered what it could be. Here's how I approached it, you may have done it totally differently and that's fine too 😊



Lexi's product ended in 3. I used this to firstly eliminate some of the options.

Even numbers multiply together to make even products, so it wasn't any of the even columns.

I was left with the '1' column, '3' column, '5' column, '7' column and '9' column

Multiples of 5 (25, 35, 45) multiplied together would end in 5 or 0, so it wasn't those.

I was left with the '1' column, '3' column, '7' column and '9' column

Next I considered the ones in each of the columns that I was left with. I knew that some of these 'ones' when multiplied together 3 times must lead to a product ending in 3.

I knew instantly that 1x1x1 = 1 so I discounted 21 x 31 x 41

I knew that 3 x 3 x 3 = 27 so 23 x 33 x 43 must have a product ending in 7.

So I was left with either 27 x 37 x 47 or 29 x 39 x 49

7 x 7 x 7 = 343, which ends in '3' so I knew it could be 27 x 37 x 47.

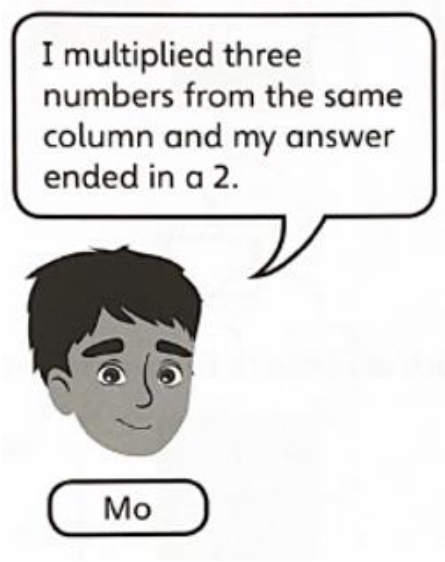
9 x 9 x 9 = 729, so I then knew it couldn't be 29 x 39 x 49

I returned to check if 27 x 37 x 47 = 46953.

27 x 37 = 999

999 x 47 = 46,953

So, **the numbers Lexi multiplied were 27 x 37 x 47.**



If Mo's product ends in a 2, his number is even.

Straight away this meant that I could discount the odd columns. Odd numbers x odd numbers = odd numbers.

So I was left with the '2' column, '4' column, '6' column, '8' column and the '0' column

2 (or more) digit numbers ending in 0 are multiples of ten. When multiples of ten are multiplied together, the product is also a multiple of ten. This meant I knew Mo wasn't multiplying 20 x 30 x 40.

I was still left with the '2' column, '4' column, '6' column and the '8' column.

I used the same method as I did with Lexi to see if the 'ones' from each of the columns could lead to a product that ended in 2.

2 x 2 x 2 = 8, so it wasn't the 22 x 32 x 42

4 x 4 x 4 = 64 so it wasn't 24 x 34 x 44

6 x 6 x 6 = 216 so it wasn't 26 x 36 x 46

8 x 8 x 8 = 512, which ends in 2. So, **Mo must have been multiplying 28 x 38 x 48.**

28 x 38 x 48 = 51,072 but you didn't need to calculate the answer.

Consecutive numbers means one number after the next.

So the first thing I did was think about all of the consecutive numbers it could be, based on the ones. For example:

It could be 21 x 22 x 22 or 31 x 32 x 33 -it's the 'ones' numbers that make in consecutive, so I thought about them on their own:

1 x 2 x 3

2 x 3 x 4

3 x 4 x 5

4 x 5 x 6

5 x 6 x 7

6 x 7 x 8

7 x 8 x 9

8 x 9 x 0

0 x 1 x 2 (imagining that the numbers crossed the ten boundary, e.g 30 x 31 x 32)

Then I used my multiplication knowledge to eliminate some options.

When 0 is a factor, 0 is the product

Anything x 5 = a product ending in 5 or 0

I was left with

1 x 2 x 3

2 x 3 x 4

6 x 7 x 8

7 x 8 x 9

So I calculated these, to see if the product ended in 4, like in Zac's product.

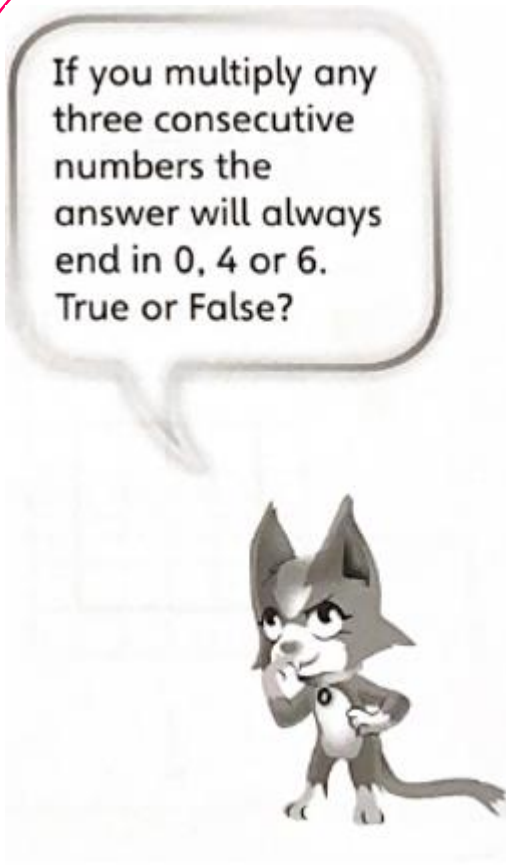
2 x 3 x 4 = 24 **and** 7 x 8 x 9 = 50

So I knew that Zac's numbers must have either been _2 x _3 x _4 or _7 x _8 x_9

I worked through them:

22 x 23 x 24 = 12,144 X 32 x 33 x 34 = 45,408 X 42 x 43 x 44 = 79,464 X

27 x 28 x 29 = 21,924 ✓ **Zac multiplied 27 x 28 x 29**



True!

If you look at all of the consecutive 'ones' numbers that you multiply could have you will get this list:

0 x 1 x 2

1 x 2 x 3

2 x 3 x 4

3 x 4 x 5

4 x 5 x 6

5 x 6 x 7

6 x 7 x 8

7 x 8 x 9

8 x 9 x 0

If you find their products, you will find that all of these products end in either 0, 4 or 6.

0 x 1 x 2 = 0

1 x 2 x 3 = 6

2 x 3 x 4 = 24

3 x 4 x 5 = 60

4 x 5 x 6 = 120

5 x 6 x 7 = 210

6 x 7 x 8 = 336

7 x 8 x 9 = 504

8 x 9 x 0 = 0