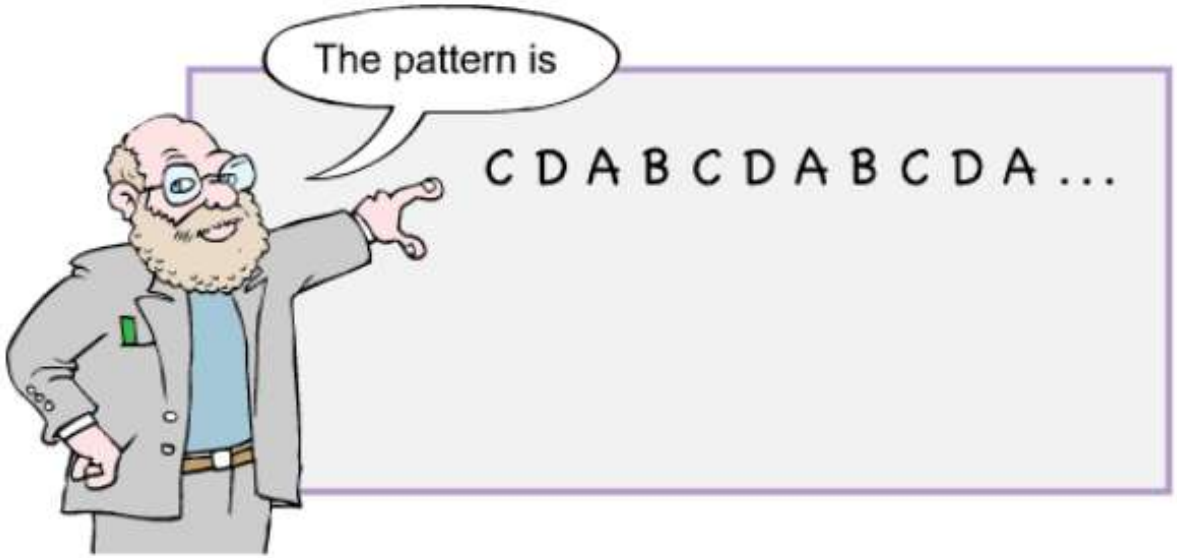
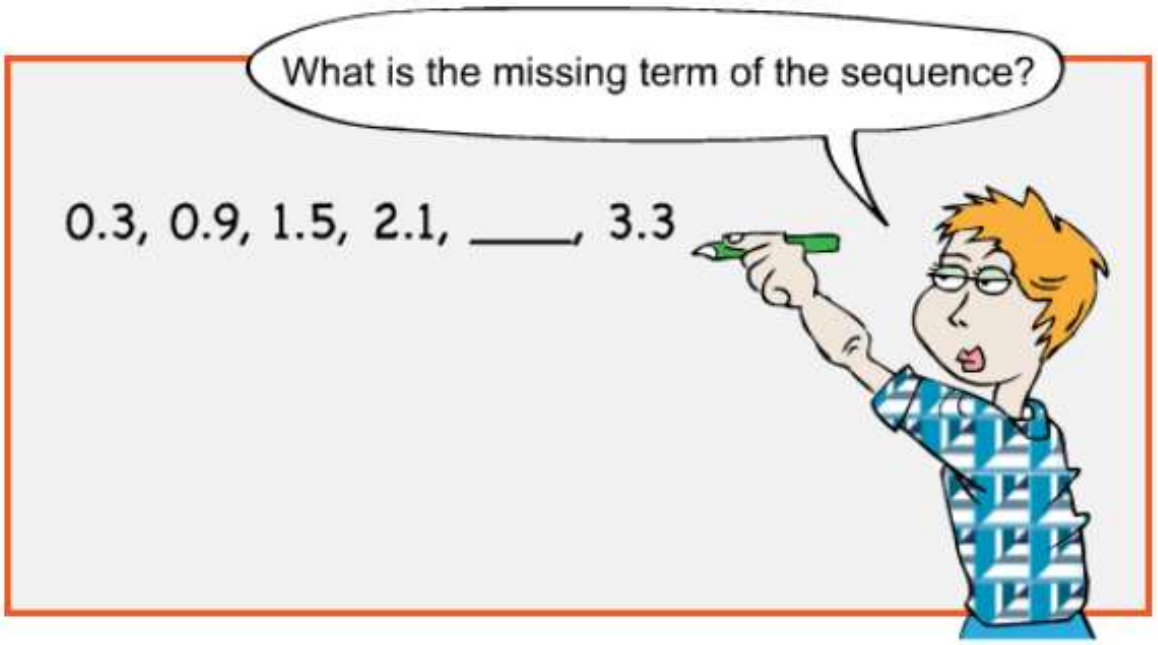
The letters A, B, C and D are used to make a repeating pattern.



If the pattern continues, what will be the 43rd letter?

- A
- B
- C
- D



- 2.6
- 2.7
- 2.8
- 2.9

Here are three puzzle houses.

The number on each roof is the answer to a number sentence formed by the other three numbers.

What is the value of X?

- 48
- 54
- 56
- 60

This grid is used to place words into code.

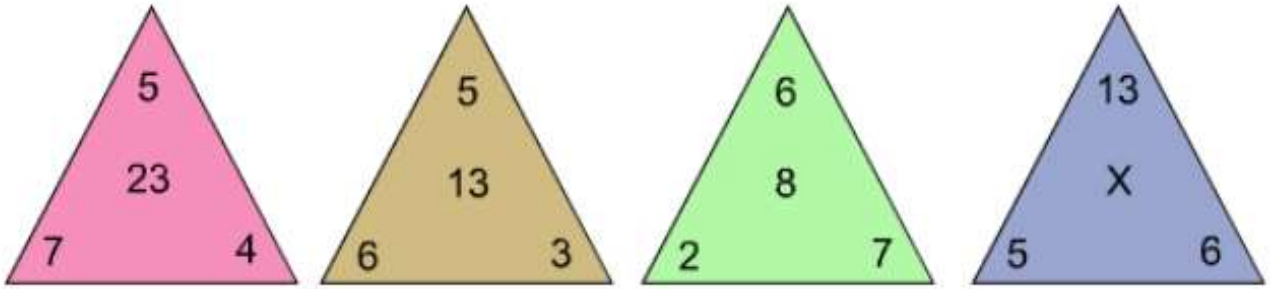
4	L	M	N	O	P	Q	R	S	T
3	K	3	4	5	6	7	8	9	U
2	J	2	1	0	Z	Y	X	W	V
1	I	H	G	F	E	D	C	B	A
	1	2	3	4	5	6	7	8	9

The code for P is (5, 4).

What is the code for YES?

- (2, 6), (1, 5), (4, 8)
- (2, 6), (5, 1), (4, 8)
- (6, 2), (5, 1), (8, 4)
- (6, 2), (1, 5), (8, 4)

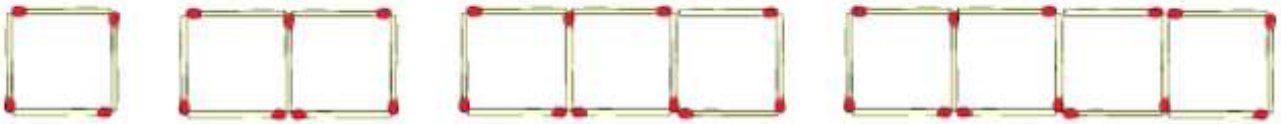
The four numbers in each of the triangles follow a pattern.



What is the value of X?

- 17
- 18
- 19
- 20

Mark is making this pattern of squares using matches.



He summarised the information in the table:

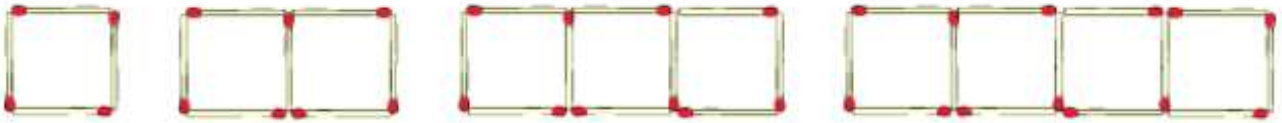
Number of squares	1	2	3	4
Number of matches	4	7	10	13

Mark continues the pattern of squares.

How many matches will he need to make 10 squares?

- 29
- 31
- 33
- 34

Mark is making this pattern of squares using matches.



He summarised the information in the table:

Number of squares	1	2	3	4
Number of matches	4	7	10	13

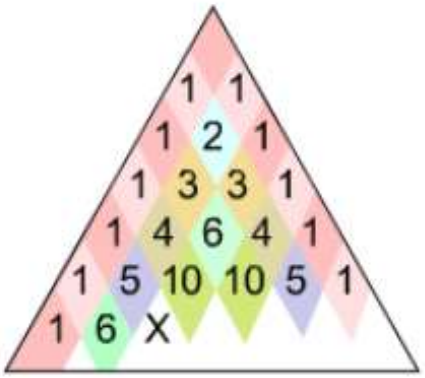
Mark continues the pattern of squares.

How many squares will be made with 70 matches?

- 21
- 22
- 23
- 24

This pattern is known as Pascal's triangle.

Row 1:
Row 2:
Row 3:
Row 4:
Row 5:
Row 6:

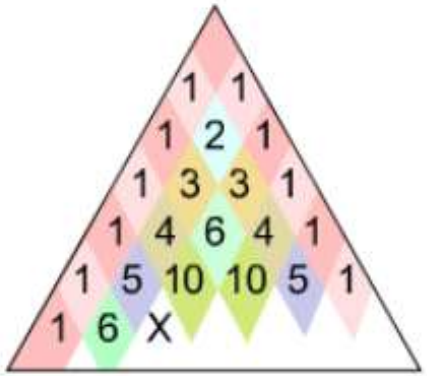


X =

- 9
- 14
- 15
- 20

This pattern is known as Pascal's triangle.

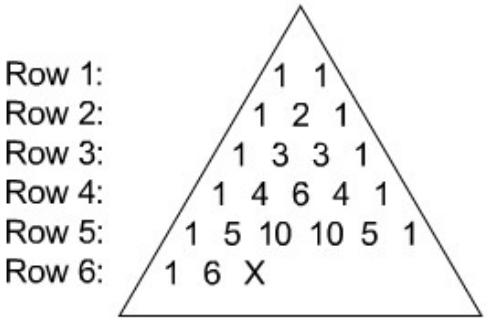
Row 1:
Row 2:
Row 3:
Row 4:
Row 5:
Row 6:



Row 9 is

- 1 9 36 84 126 84 36 9 1
- 1 9 36 84 126 126 84 36 9 1
- 1 9 36 81 108 81 36 9 1
- 1 9 36 81 108 108 81 36 9 1

This pattern is known as Pascal's triangle.



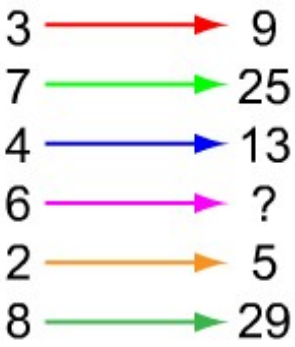
The numbers in the rows of Pascal's triangle can be used to find the number of possible combinations of different colours when choosing from a certain number of colours. For example, supposing you are choosing from four different colours: red, blue, green and yellow. Using Row 4 of Pascal's triangle, you can see that there is 1 choice for having none of the four colours. There are 4 choices for just one colour (red, blue, green or yellow) and 6 choices for combinations of any two of the colours (red/blue, red/green, red/yellow, blue/green, blue/yellow and green/yellow). There are 4 choices for combinations of three colours (red/blue/green, red/blue/yellow, red/green /yellow and blue/green/yellow) and 1 choice for all four colours.

If you were choosing from five colours you would use Row 5. There is 1 choice for none of the colours, 5 choices for just one colour, 10 choices for combinations of two colours and so on.

In how many different combinations could you choose three colours from seven?

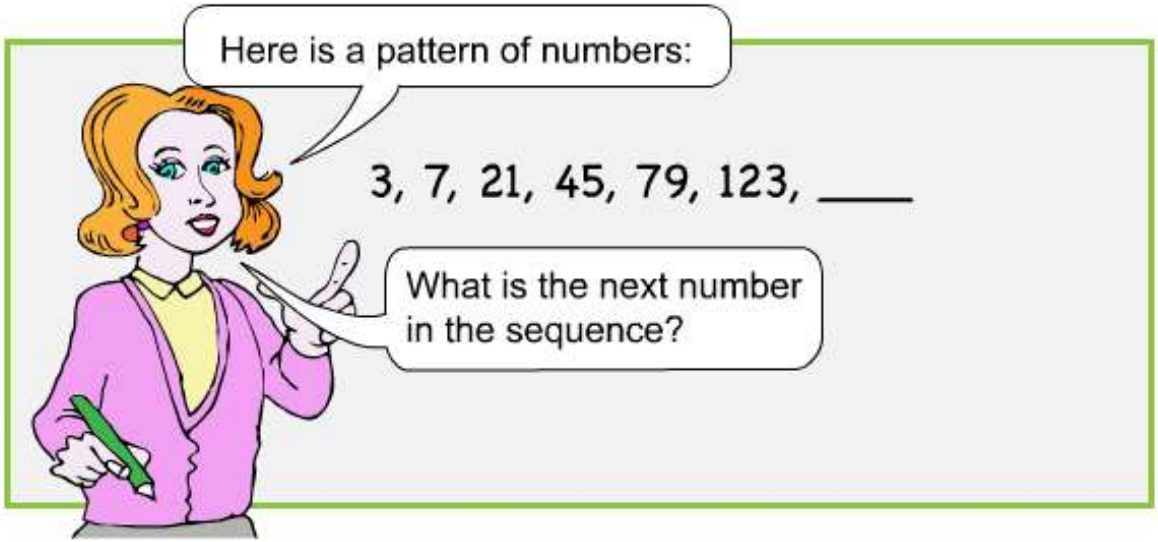
- 1
- 7
- 21
- 35

Each number on the left produces the number on the right using a certain numerical process.



What is the missing number?

- 23
- 21
- 19
- 17



- 157
- 167
- 177
- 187

Numbers are written in a table.

Red numbers	Blue numbers	Green numbers	Yellow numbers
2	4	6	8
10	12	14	16
18	20	22	24
26	28	30	32
34	36	38	40
42			

What is the eighth number in the green column?

- 56
- 58
- 60
- 62

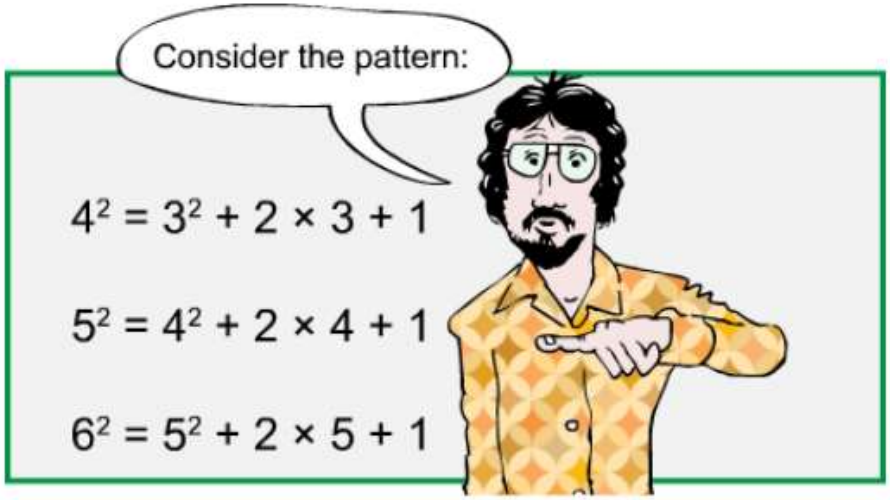
Numbers are written in a table.

Red numbers	Blue numbers	Green numbers	Yellow numbers
2	4	6	8
10	12	14	16
18	20	22	24
26	28	30	32
34	36	38	40
42			

In what column would the number 100 be recorded?

- Red
- Blue
- Green
- Yellow

When a number is squared it is multiplied by itself. So $3^2 = 3 \times 3 = 9$.



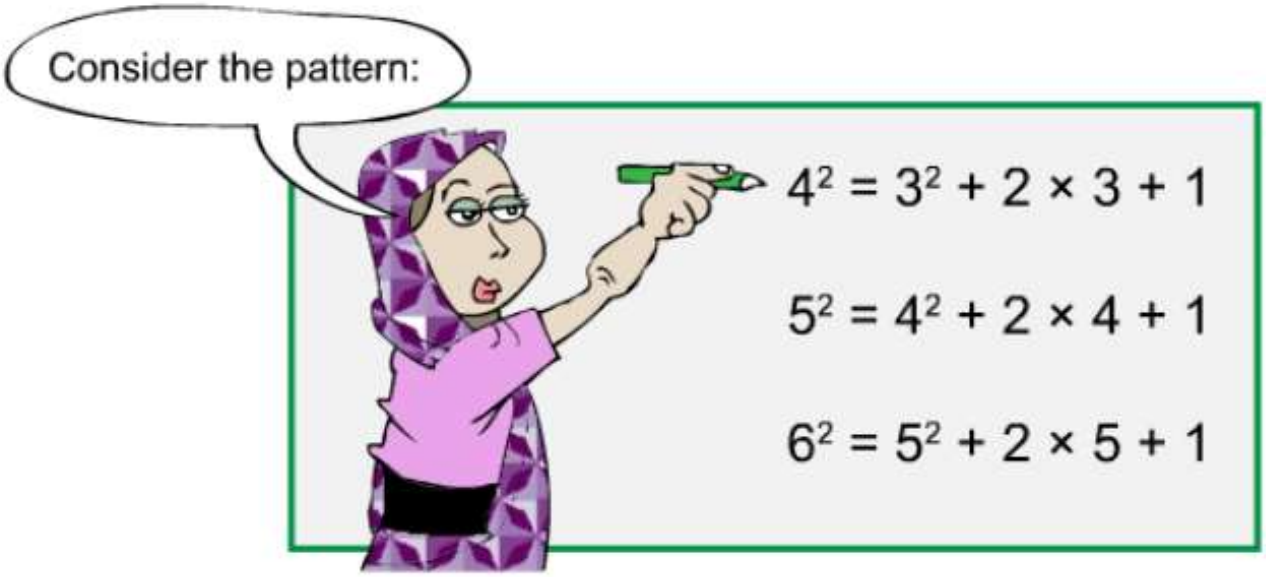
This pattern continues.

$13^2 =$ _____

Which correctly completes the above line of the pattern?

- $12^2 + 12 \times 5 + 1$
- $12^2 + 2 \times 12 + 1$
- $13^2 + 2 \times 13 + 1$
- $12^2 + 2 \times 13 + 1$

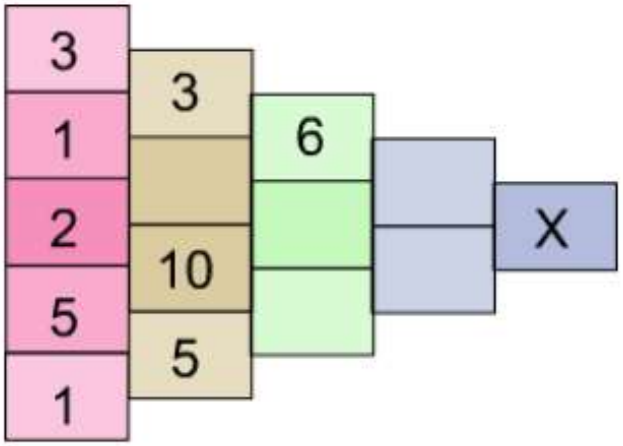
When a number is squared it is multiplied by itself. So $3^2 = 3 \times 3 = 9$.



Using the pattern, what is 101^2?

- 1201
- 10 201
- 1221
- 10 221

The numbers in the blocks follow a pattern.



X =

- 120 000
- 20 000
- 12000
- 2000

The numbers in the table follow a particular rule.

Top number	6	10	4	8	2	14
Bottom number	6	8	5	7		10

What number is used to complete the table?

- 1
- 2
- 3
- 4

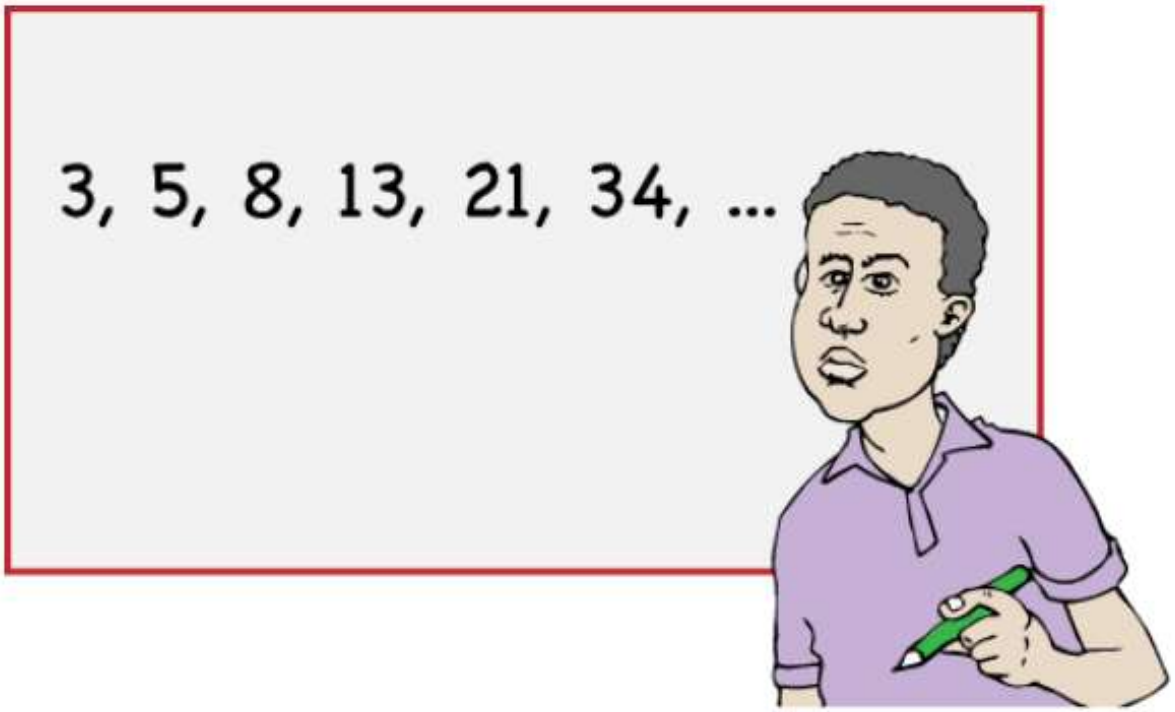
Shelby writes a sequence of numbers starting with 2.

The rule for the sequence is to double the number and then add 3.

What is the fifth number in Shelby's sequence?

- 5
- 17
- 37
- 77

Jahn wrote this sequence:



What will be the next number in his sequence?

- 37
- 53
- 55
- 68