

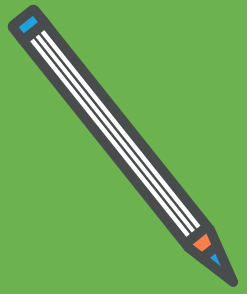
Mathvember

By Whizz Education


Daily challenges

Upper KS2

Questions 1 - 22

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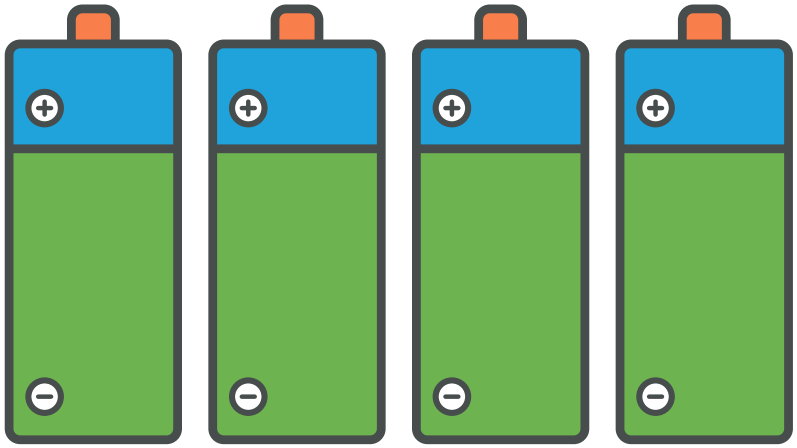
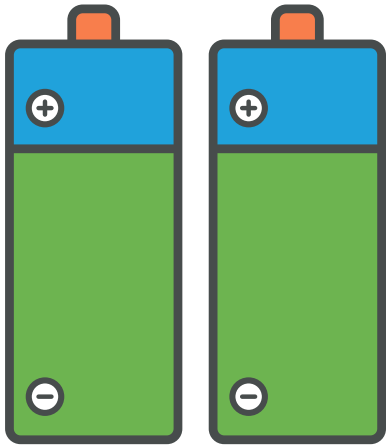
Day 1
Question

A shop sells batteries in packs of 4 and packs of 2.

Can you think of an interesting question using this information?



4 for £1.48



2 for 85p

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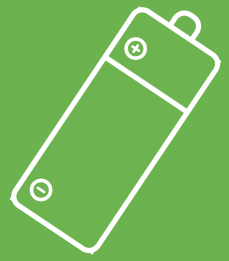
Day 1
Answer



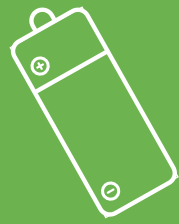
Here are some questions we came up with:

Which is cheaper - one pack of 4 batteries or two packs of 2 batteries?

If I buy a pack of 4 batteries what would be the price of each battery?

If I buy a pack of 2 batteries what would be the price of each battery?

How much would it cost to buy 3 packs of 4 batteries and 1 pack of 2?



If I have £10 how many batteries can I buy?

I need 9 batteries which packs should I buy?

What is the difference between two packs of 4 batteries and 4 packs of 2 batteries?

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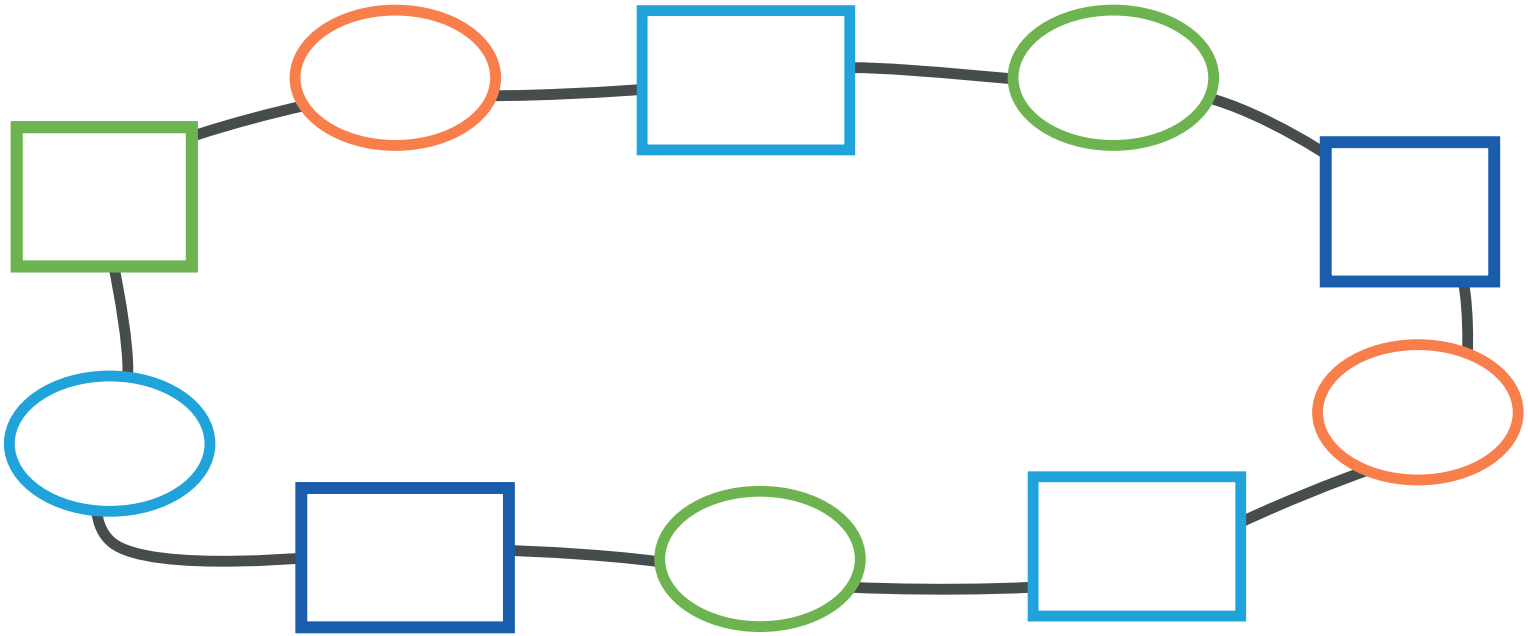
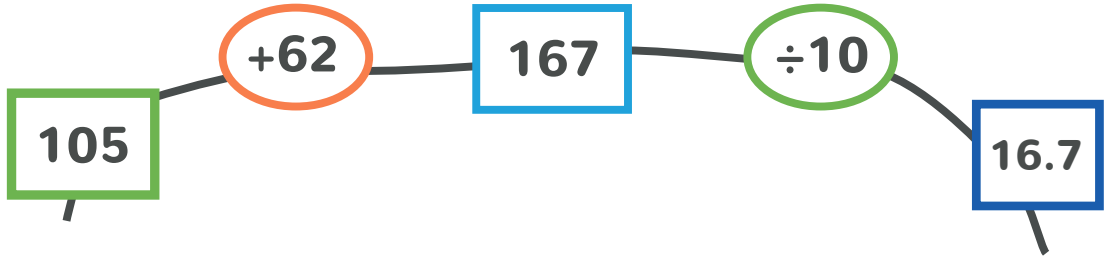
Day 2 Question

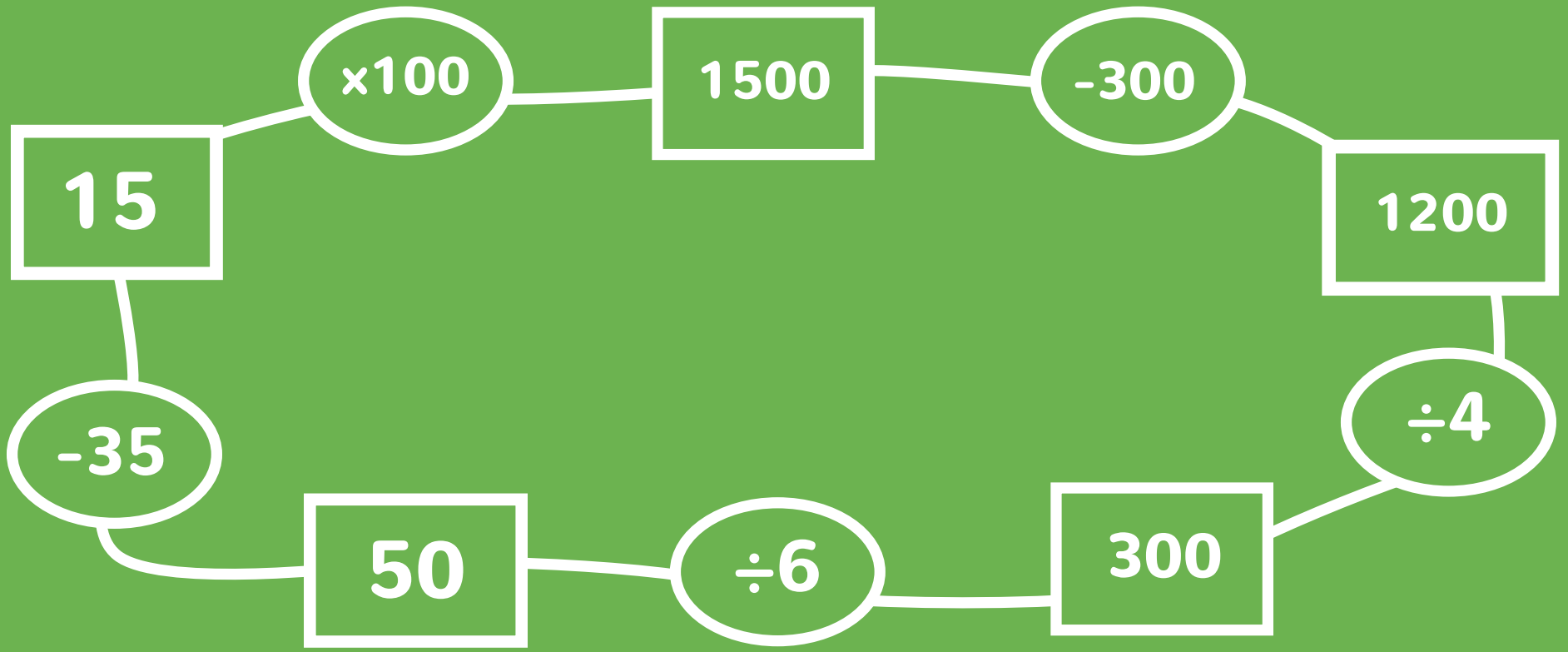


Copy or print the bracelet or draw your own.

Write any two or three digit number in the rectangles, then write in the appropriate operation in the circle going clockwise round the bracelet. Try multiplying and dividing by 10, 100, 1000. You could also try decimal numbers. For example:



Here is an example, answers will vary



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Day 3
Question

$$2 + 0 + 1 + 8 = 11$$

The digits of this year 2018 add up total 11.
When is the next time the digits of the year will add up to 11?
When else will it happen?

Try the year you were born.

Guy Fawkes was born in 1570 - the digits of his year total 13.
How many other years since 1570 to 2018 have the digits totalled 13?

$$1 + 5 + 7 + 0 = 13$$

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Day 3
Answer

When is the next time the digits of the year will add up to 11?

2027

When else will it happen?

2036, 2045, 2054, 2063, 2072, 2081

How many other years since 1570 to 2018 have the digits totalled 13?

1606, 1615, 1624, 1633, 1642, 1651, 1660, 1660, 1705, 1714, 1723, 1732, 1741, 1750, 1804, 1813, 1822, 1831, 1840, 1903, 1912, 1921, 1930

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Day 4
Question

Divide these nine numbers into three groups of three so that the **sum** of each group is the same.

43 11 73

91 25 51

85 63 35

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Day 4
Answer

$$11 + 63 + 85 = 159$$

$$25 + 43 + 91 = 159$$

$$35 + 51 + 73 = 159$$

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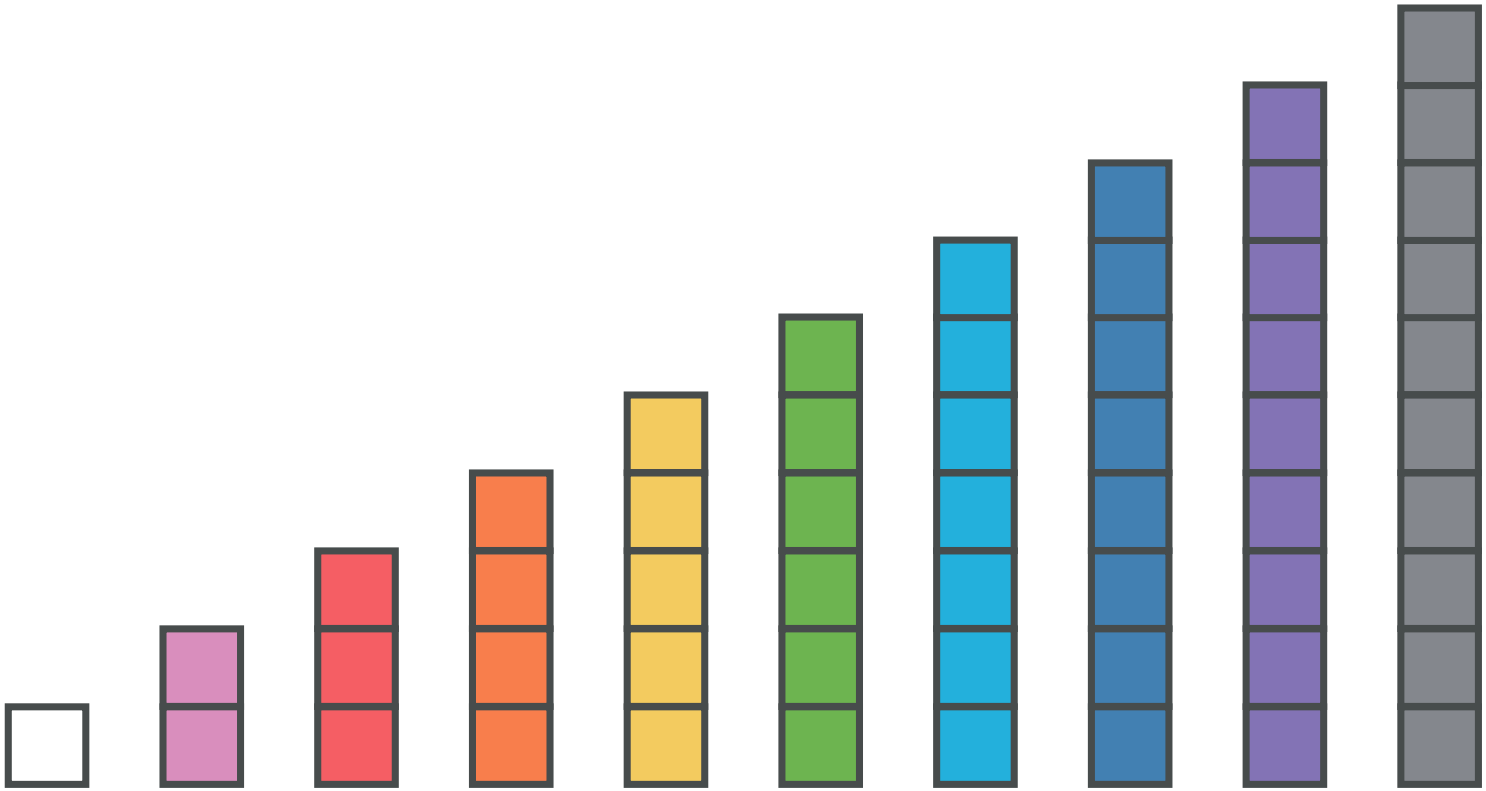
Day 5
Question

Using only three rods is it possible to make number statements for all the numbers from 1 - 10 using addition and subtraction only?

You can only use each rod once to make each number



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Day 5
Answer

Using only three rods with each one not exceeding 10 you can add and minus the following numbers which can go from 1-13.

This is one combination of three rods:
The three numbers are 9, 3 and 1.

1 = 1

2 = 3-1

3 = 3

4 = 3+1

5 = 9-3-1

6 = 9-3

7 = 9-3+1

8 = 9-1

9 = 9

10 = 9+1

11 = 9+3-1

12 = 9+3

13 = 9+3+1

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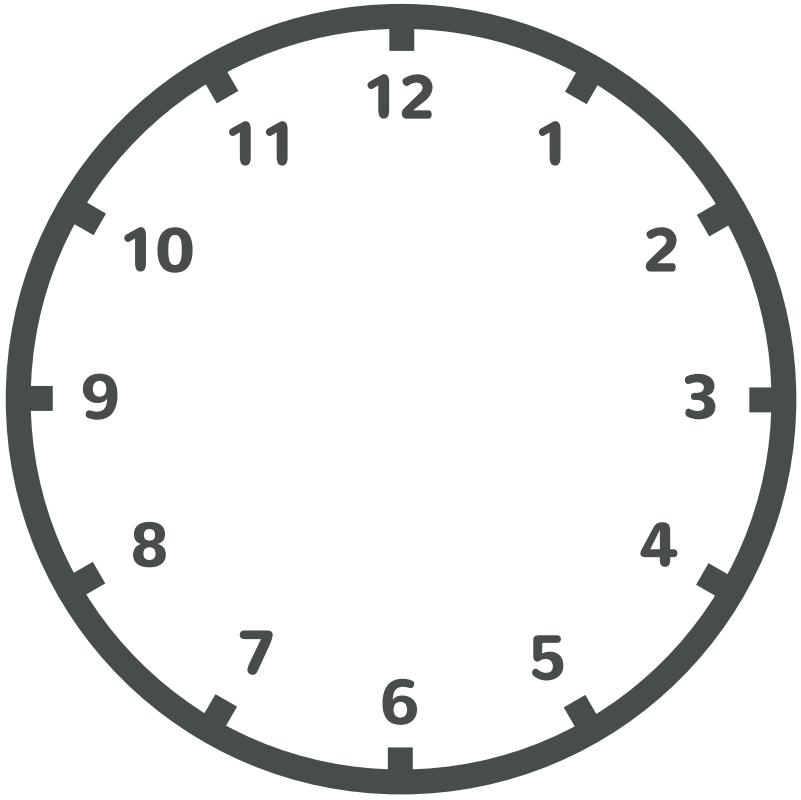
Day 6
Question

Divide the face of the clock into three parts with two straight lines so that the sum of the numbers in the three parts are in the ratio 1:1:1.

Use the diagram to help.



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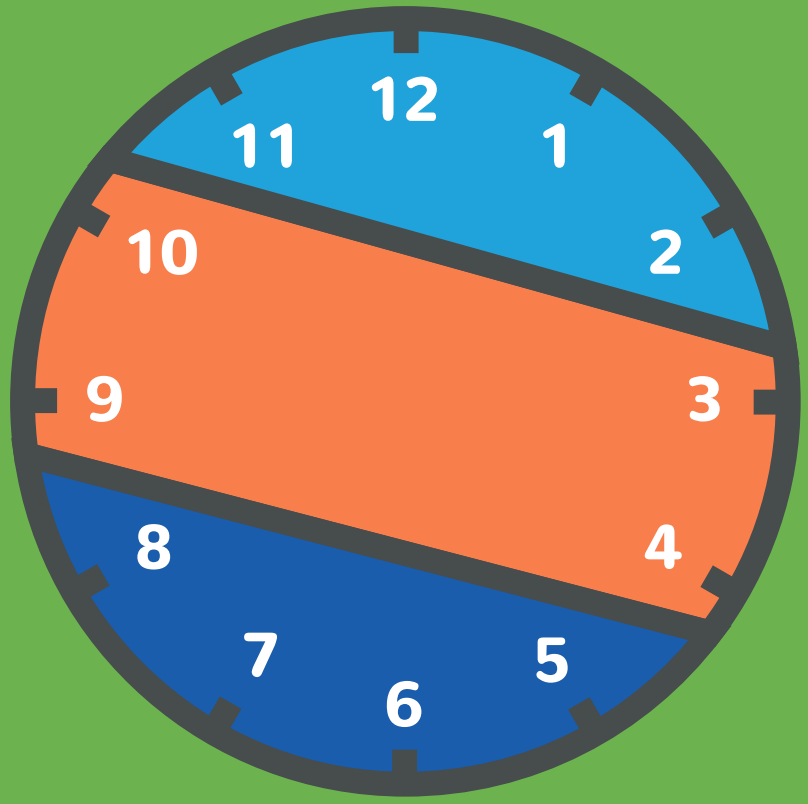
Day 6
Answer

Each part should add up to 26



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Day 7 Question

Start at 1 in the centre of this square. Find a route which reaches 100 in exactly seven steps.

Each step must be from one white square to a neighbouring one.

The given operation in the square must be performed.

Can you find a route? You can go over the same square more than once.

+51		x4		+36		+51
	-24		-5		+24	
+13		x9		x4		+19
	+20		1		-20	
+19		x4		x9		+11
	-24		-5		x4	
+51		+36		x3		+51

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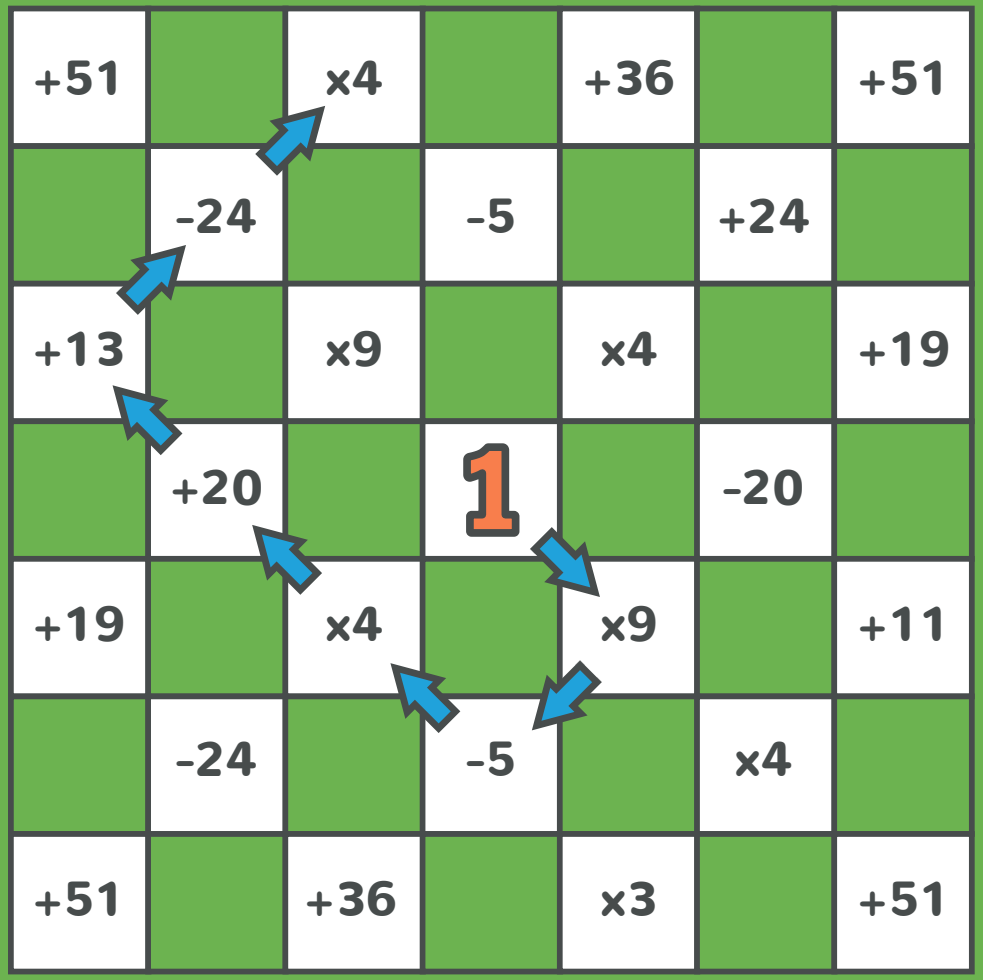
Day 7
Answer

Start with the x9 below right of the 1.



1 x 9 = 9

9 - 5 = 4

4 x 4 = 16

16 + 20 = 36

36 + 13 = 49

49 - 24 = 25

25 x 4 = 100

Estimate how many times you breathe in a year.

How did you make your estimation?

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Day 8
Answer

Estimate how many times you breathe in a year.

Students need to discuss how they could work this out, they need to have a method and reason for their choices and justify their assumptions.

A calculator may be used.

Roughly 10 breaths per minute

100 breaths in 10 minutes

600 breaths in an hour

600 x 24 = 14,400 in a day

14,400 x 365 days = approximately 5 million a year

Investigate further: How many seconds have you lived?

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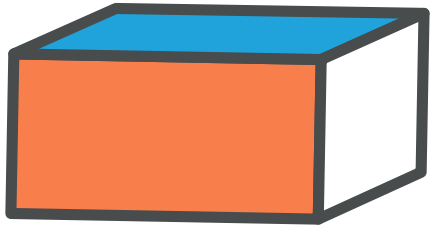
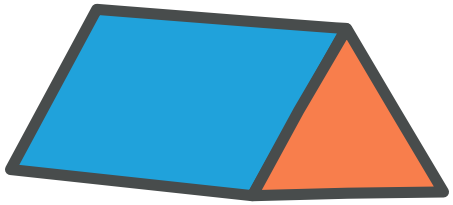
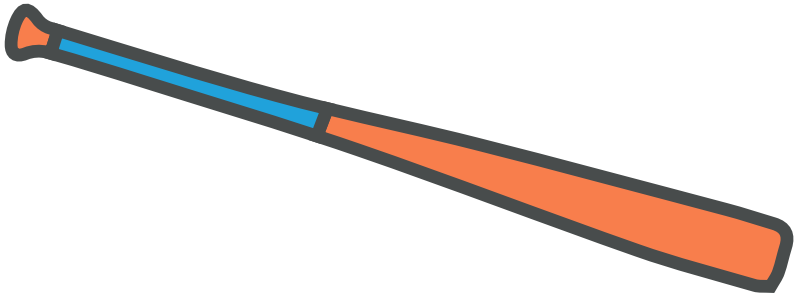
Day 9
Question

Below are two items. One costs £6 more than the other.
Two of each of the item costs £22 in total.
How much does each item cost?

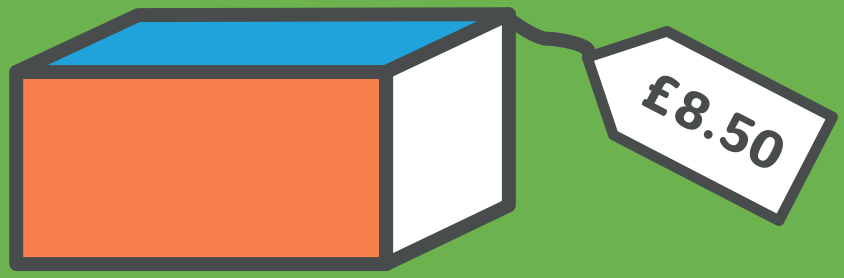


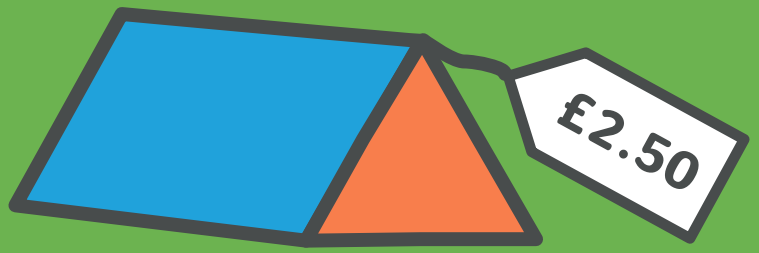


Try this one...
A bat and a ball cost £11 altogether
The bat costs £10 more than the ball.
How much do they each cost?



One item = £8.50 and the other item = £2.50





The bat = £10.50 and the ball = 50p.

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Day 10
Question

Using the digits 1, 2, 3, 4, 5, 6 make two 3-digit numbers and multiply them together.

What is the largest possible product?

What is the smallest product?

A product that is a multiple of 10?

Largest possible product:
631 x 542 = 342,002

Smallest possible product:
246 x 135 = 33,210 (not 235 x 146)

A product that is a multiple of 10:
The 2 three digit numbers should end in 5 and any other even number

For example:
632 x 415 = 262,280
135 x 246 = 33,210

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Day 11
Question

$$2.3 + 2.7 = 5$$

Write down three more pairs of decimal numbers whose sum is 5

Try writing some more decimal numbers with two decimal places whose sum is 5

The number statements will vary

For example:

$4.9 + 0.1 = 5$

$1.8 + 3.2 = 5$

$2.75 + 2.25 = 5$

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Day 12
Question

Cross out the numbers that are included in the statements below.

You should be left with one number

16 45 64

30

49 48

72

36 75 90 27

Numbers that are multiple of 3 and 5

Square numbers

Numbers with a factor of 8

What is the remaining number?

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Day 12
Answer

Numbers with multiple of 3 and 5

30, 45, 75, 90 (which are the multiples of 15)

Square numbers

16, 36, 49, 64, 81

Numbers with a factor of 8

16, 64, 48, 72,

The number left is 27

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Day 13
Question

0 1 2 3 4 5 6 7 8 9

Using all the digits 0 - 9 each time make:

Five numbers that are multiples of 3

Five numbers that are multiples of 7

Five prime numbers

For example:

Five numbers that are multiples of 3

12, 39, 45, 60, 78

Five numbers that are multiples of 7

7, 42, 63, 98, 105

Five prime numbers

5, 23, 67, 89, 401

There are other solutions.

Think of a number.

Double it.

Add 10.

Halve it.

Take away your original number.

Is your answer 5?

Try this with a different starting number.

Did you get a different result?

Why does this happen?

You have 'double it' and 'halve it', which together bring you back to your original number, but as you have 'add ten' in the middle of 'double it' and 'halve it' you must add five because 'add ten' is before 'halve it'.

So now we have:

Think of a number

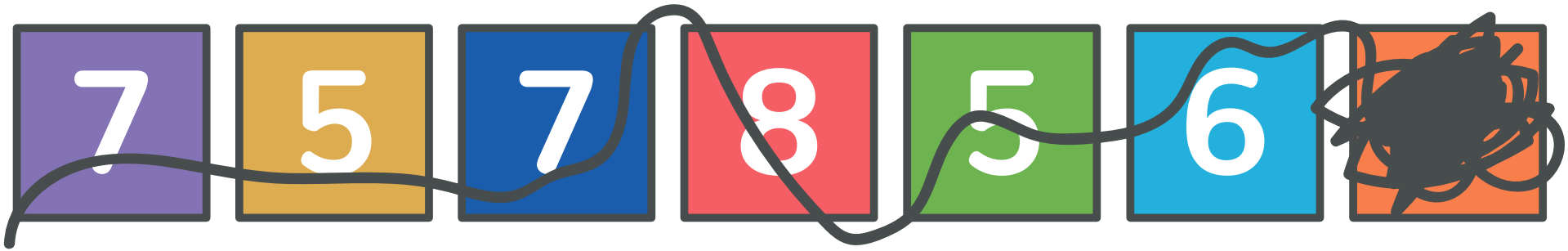
Add 5

Take away you original number

Is your answer 5?

As you can see you are just adding five to your original number then taking away your original number which is five.

Ben makes one 4-digit number and one 3-digit number using all the following digit cards. However, Ben's baby sister has scribbled over the cards and one of the digits has been coloured in.



The difference between the numbers is 4921.
What two numbers did he make? Which is the missing digit?

This is tricky as not all the digits are given.

The students need to think of the combinations.

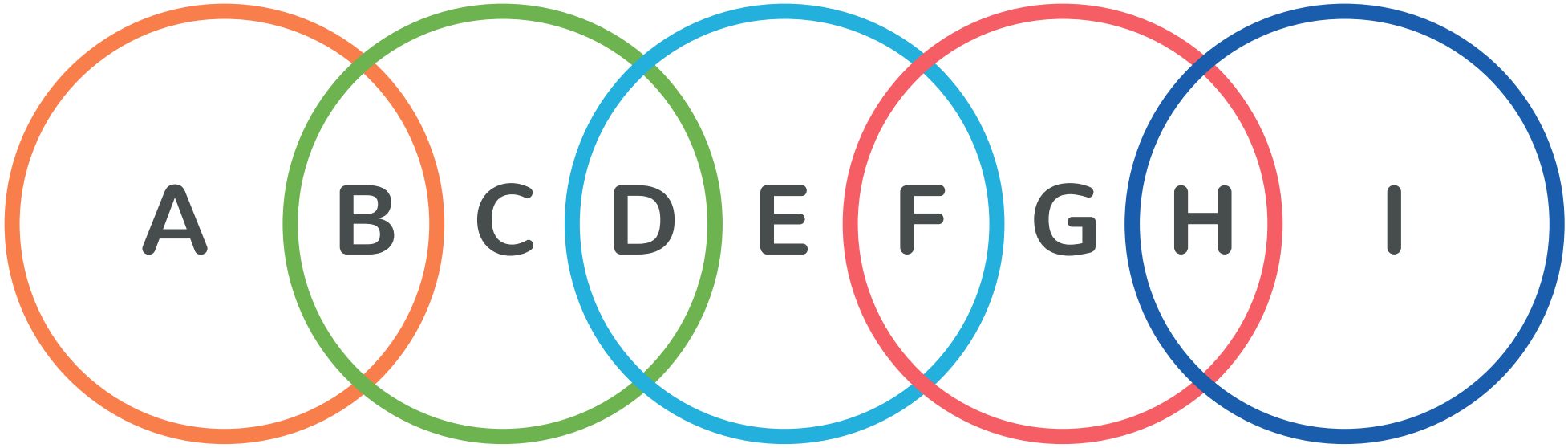
5776 - 855 = 4921

The missing digit is 5

Use each of the digits 1 to 9 once.

Replace each letter with one of the digits.

Make the same total in each circle.



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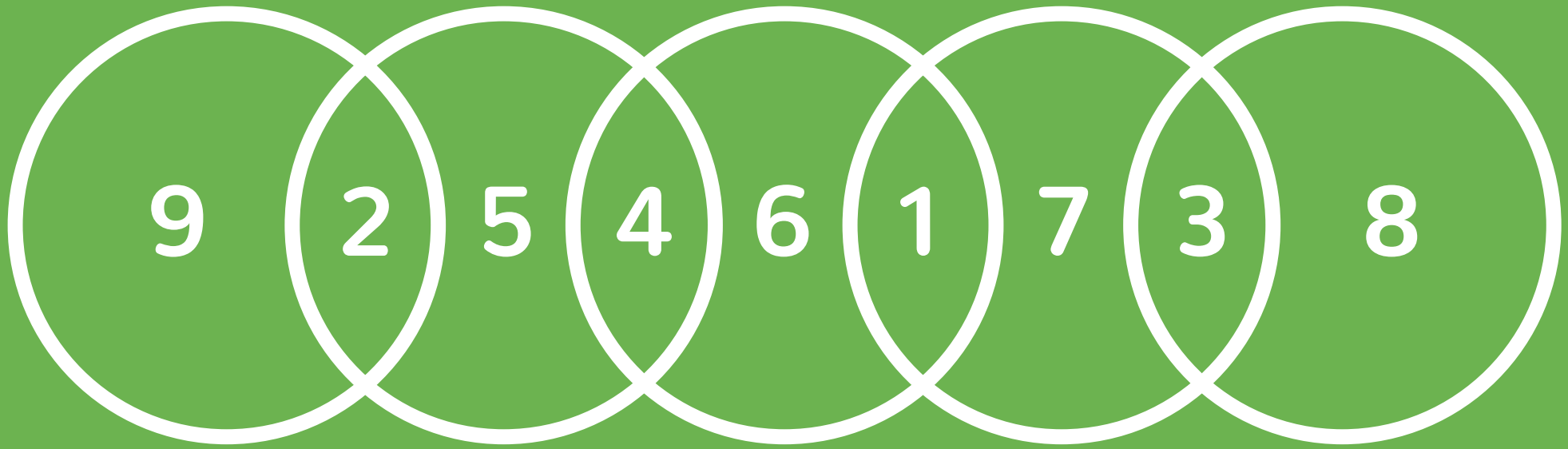
Day 16
Answer



Or it's reverse. The total in each circle is 11.

My age this year is a multiple of 8.

Next year it will be a multiple of 7.

How old am I?

Last year my age was a square number.

Next year it will be a cube number.

How old am I?

How long must I wait until my age is both a square and a cube number?

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Day 17
Answer

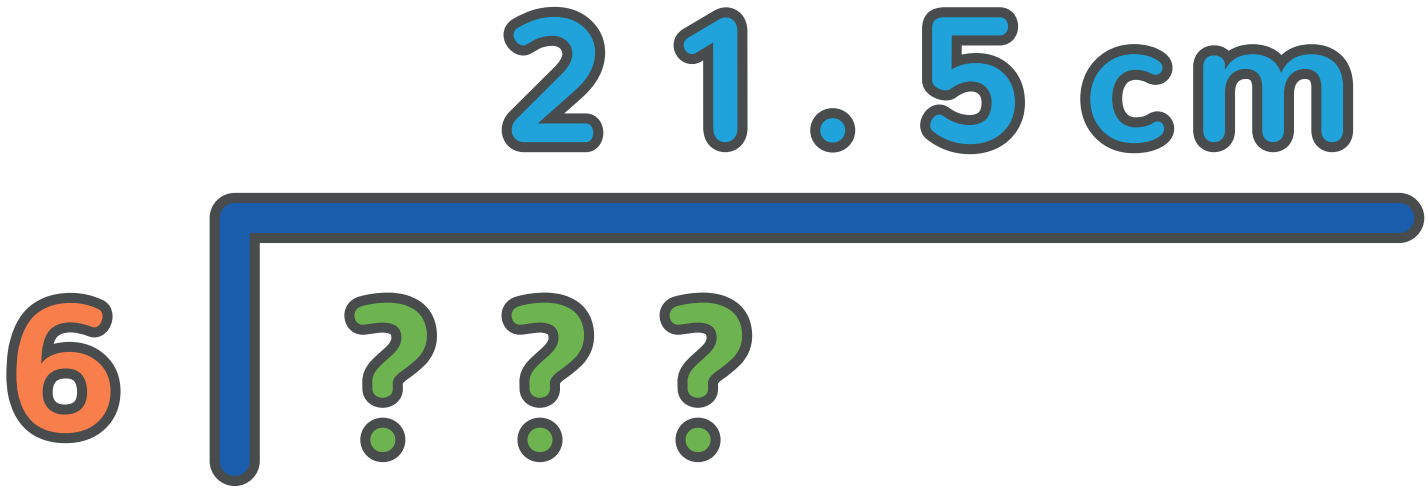
Write out 7 and 8 times table.

I am 48 (8 x 6) next year 7 x 7 = 49 or 104 years old (8 x 13 and next year 7 x 15)

I am now 26 years old. 25 (5x5) square number.

When I am 64 years old my age will be both square (8 x 8) and cube (4 x 4 x 4) number.

Look at this incomplete calculation.



Work out the missing amounts.

Explain how you solved this.

Write a word problem for this calculation.

Using the inverse is the best way to solve this question

$$21.5 \times 6 = 129 \text{ cm}$$

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Day 19
Question

Choose one number from each box to make three different dividing sentences.

832	1533	450
30	52	21
16	73	15

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Day 19
Answer

$832 \div 52 = 18$ or $832 \div 18 = 52$

$1533 \div 21 = 73$ or $1533 \div 73 = 21$

$450 \div 30 = 15$ or $450 \div 15 = 30$

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Day 20
Question

Card A			
1	3	5	7
9	11	13	15

Card B			
2	3	6	7
10	11	14	15

Card C			
4	5	6	7
12	13	14	15

Card D			
8	9	10	11
12	13	14	15

Ask a friend to look at the Magic Number Cards and choose a number between 1 and 15.

Ask them NOT to tell you the number they have chosen.

Ask them to tell you ALL the cards where they can see their number.

What would be the first numbers on the cards E, F, G, H, I, J, K, and so on?

What other number patterns can you see elsewhere on each of the Magic Number cards?

(CLUE: When thinking about ‘missing numbers’, include the digit ‘0’ at the start)

What differences in the number patterns can you see between the four Magic Number Cards?

Day 20
Answer

For example, if they choose the number 3, they should tell you that their number is on cards A and B.

You then ADD together the first numbers you can see on each of the cards they named.

(NOTE: the first number on Card A is 1, B is 2, C is 4, and D is 8)

THE ANSWER YOU GET IS THE NUMBER YOUR FRIEND FIRST CHOSE!

On the Magic Number Cards A, B, C and D the first numbers are 1, 2, 4 and 8, respectively.

The numbers double, or multiply by 2, for each successive number.

For example 1, 1 x 2 = 2, 2 x 2 = 4 and 4 x 2 = 8.

So, using this same ‘x 2’ number pattern, you should find the first number on card E = 16, on F = 32, on G = 64, on H = 128, on I = 256, on J = 512, on K = 1024, and so on.

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Day 20
Answer

Looking carefully at each of the four number cards,
and including ‘0’, There are a few number patterns:

Card A

All the ODD numbers from 1-15:- 1 3 5 7 9 11 13 15 (with 0 2 4 6 8 10 12 & 14 missing)

Card B

(0 & 1 missing) 2 3 (4 & 5 missing) 6 7 (8 & 9 missing) 10 11 (12 & 13 missing) 14 15

Card C

(0 1 2 3 missing) 4 5 6 7 (8 9 10 11 missing) 12 13 14 15

Card D

(0 1 2 3 4 5 6 7 missing) 8 9 10 11 12 13 14 15 (or consecutive numbers 8-15)

Differences you might have noticed in the number patterns between each of the four cards are that:

On card A there are no consecutive numbers (or no number followed immediately by the next number in the series), so we could say that each one number is on its own, with a gap of one missing number

On card B the numbers are grouped in sets of two, or pairs of consecutive numbers (such as 2 & 3), with a gap of two missing numbers (0 & 1).

On card C the numbers are grouped in sets of four consecutive numbers (such as 4, 5, 6 & 7), with a gap of four missing numbers (8, 9, 10 & 11).

On card D the whole list of numbers is a set of eight consecutive numbers (8, 9, 10, 11, 12, 13, 14 & 15), with a gap of eight missing numbers in front (0, 1, 2, 3, 4, 5, 6 & 7).

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Day 21
Question

Write down a number that is...

... multiple of 4...

... that is greater than 30...

... that is also square...

... where both digits are even.

Now come up with your own zooming in problem to try out with a partner.

Multiples of 4 greater than 30

32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 84, 88, 92, 96, 100 ....

Square numbers

36, 64, 100

Both digits are even

64

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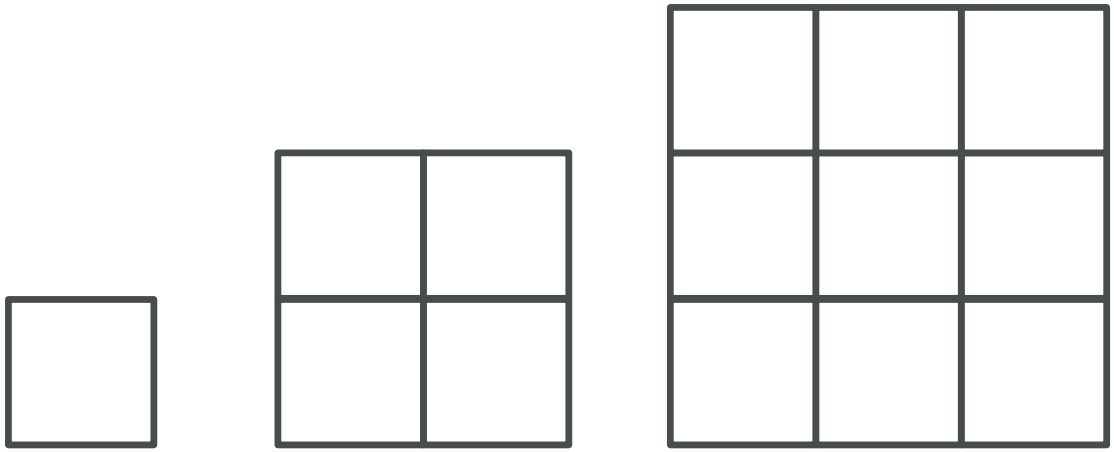
Day 22
Question



When you multiply a number by itself, the answer is a ‘square’ number.

Some examples of square numbers are 1, 4, 9, ...

We call it a ‘square’ because you can arrange the number of objects in a square shape.

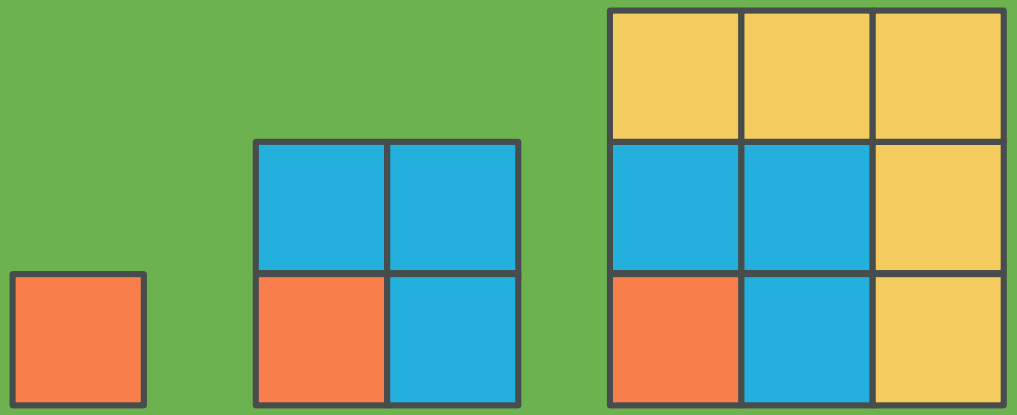
How does the sequence of square numbers grow?

Can you spot the pattern?

(HINT: It will help by building the squares numbers practically.)

Day 22
Answer

Each new square (number of objects) builds on the previous by extending the length and width by one and this increases the number of new squares by the next number in the odd number sequence.



1 1 + 3 = 4 1 + 3 + 5 = 9

So any square number can be found by adding consecutive odd numbers starting with 1.

The same sequence can also be found by looking at difference between neighbouring square numbers. For example 1, 4 the difference is 3.

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