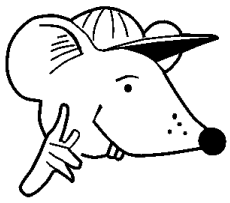
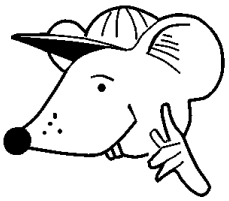


MATHEMATICS



Y3 Using and applying mathematics
3810

Solve mathematical puzzles and investigate.

Equipment

Paper, pencil, ruler
Dice, number cards, buttons/counters, boxes etc

MathSphere

Concepts

Solving problems and investigating continue in three year. Some of these problems are ‘closed’, in other words they only have one, or a few possible answers. Others are ‘open’ and can have many possible answers.

The open questions are ideal for assessing how well children use their knowledge and how imaginative they can be.

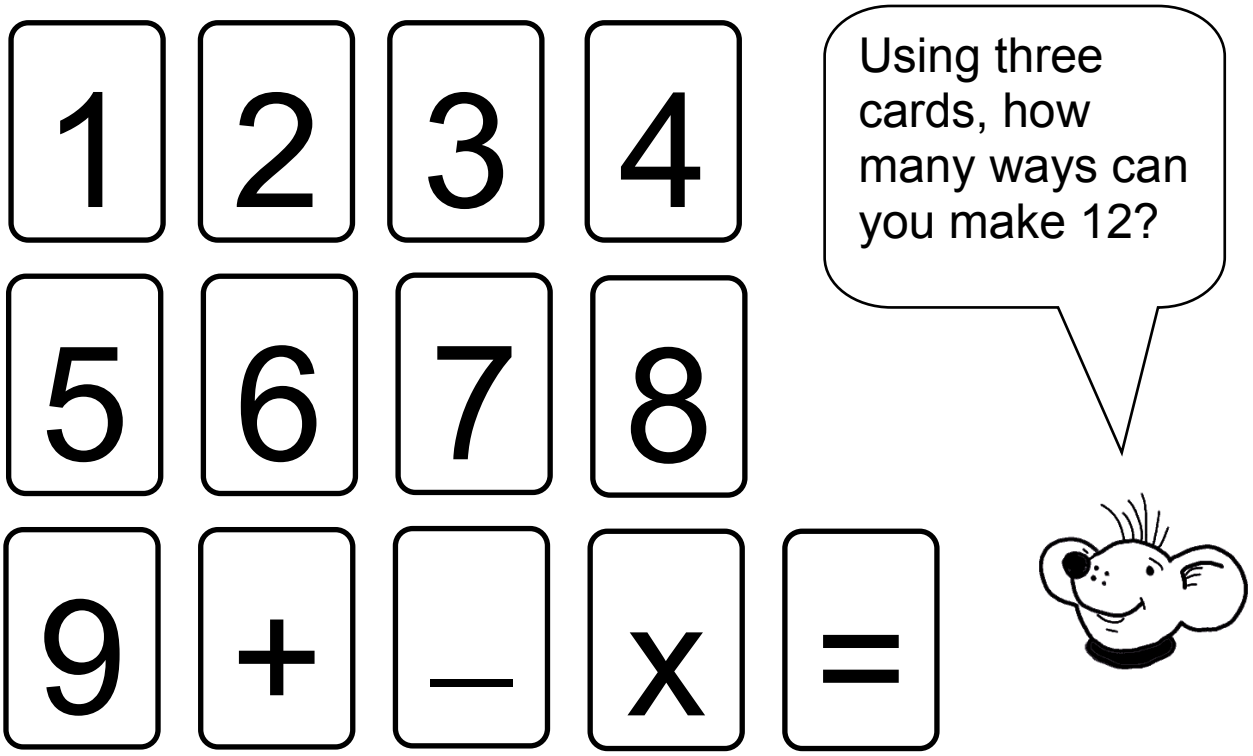
The questions on sum and product are closed and children will probably need reminding what the terms mean.

Exercises such as the magic triangle look closed to begin with but there is plenty of potential to change totals or even change the numbers that are put in. For this reason a blank triangle has been included at the end of the module.

Because of the open nature of most of these problems we have not included answers for the majority – it is an excellent idea for children to check both their own and other children’s solutions to see if they fit the criteria.

A key feature of this work is that children should become more systematic in their approach, checking as they go and looking for answers which are the same. They should be able to talk about their work, especially about how they are tackling the investigation, what the rules are and any findings they have.

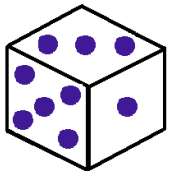
Making 12



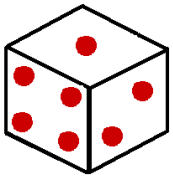
By using three cards together with some of the signs, how many ways can you make 12?

I made 12 like this:

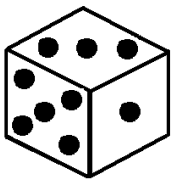
Even numbers



Blue



Red



Black

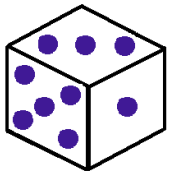
What even totals can you score when you roll three dice?

Record your answers below.

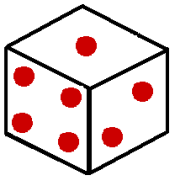
Blue		Red		Black	Total is even
	+		+		=
	+		+		=
	+		+		=
	+		+		=
	+		+		=
	+		+		=
	+		+		=

You may need more paper to record your results.

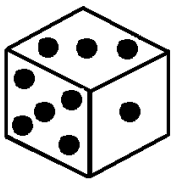
Odd numbers



Blue



Red



Black

What odd totals can you score when you roll three dice? Record your answers below.

Blue		Red		Black		Total is odd
	+		+		=	
	+		+		=	
	+		+		=	
	+		+		=	
	+		+		=	
	+		+		=	
	+		+		=	

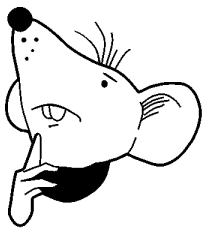
You may need more paper to record your results.

Odd numbers to make 20

1	1	3	3
5	5	5	5
7	7	9	9

Make 20 by adding four odd numbers only.

How many different ways can you do it?



By adding four odd numbers, how many ways can you make 20?

You can use the same odd number more than once! The cards above may help.

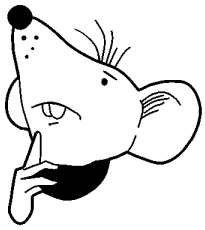
I made 20 like this:

Even numbers to make 16

2	2	2	2
4	4	4	4
6	6	8	10

Make 16 by adding four even numbers only.

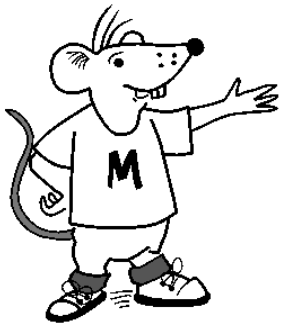
How many different ways can you do it?



By adding four even numbers, how many ways can you make 16?

You can use the same even number more than once!

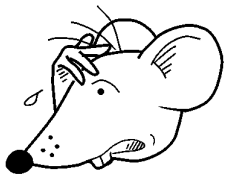
I made 16 like this:



Find the number

Remember: sum means add and product means multiply. Try and work out these problems.

Some numbers have gone missing – can you help me find them…please!



1. Find a pair of numbers with a sum of 9 and a product of 20. ☐ ☐

2. Find a pair of numbers with a sum of 10 and a product of 16. ☐ ☐

3. Find a pair of numbers with a sum of 15 and a product of 50. ☐ ☐

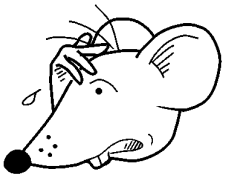
4. Find a pair of numbers with a sum of 7 and a product of 12. ☐ ☐

5. Find a pair of numbers with a sum of 12 and a product of 35. ☐ ☐

Find the number

Helpful hint:
To find the product - multiply.
To find the sum – add.

Some numbers have gone missing – can you help me find them…please!



1. Find a pair of numbers with a sum of 8 and a product of 15.

2. Find a pair of numbers with a sum of 9 and a product of 14.

3. Find a pair of numbers with a sum of 16 and a product of 60.

4. Find a pair of numbers with a sum of 10 and a product of 21.

5. Find a pair of numbers with a sum of 14 and a product of 45.

Find the missing digits

Each mark ♦ is a missing digit.
Can you find the missing digits?

1. 1♦ + ♦2 = 25

2. 1♦ + ♦4 = 38

3. 1♦ – ♦2 = 4

4. 1♦ – ♦3 = 5

5. 2♦ – ♦1 = 9

Find the missing digits

Each mark ♦ is a missing digit.
Can you find the missing digits?

1. 1♦ + ♦4 = 34

2. 1♦ + ♦5 = 36

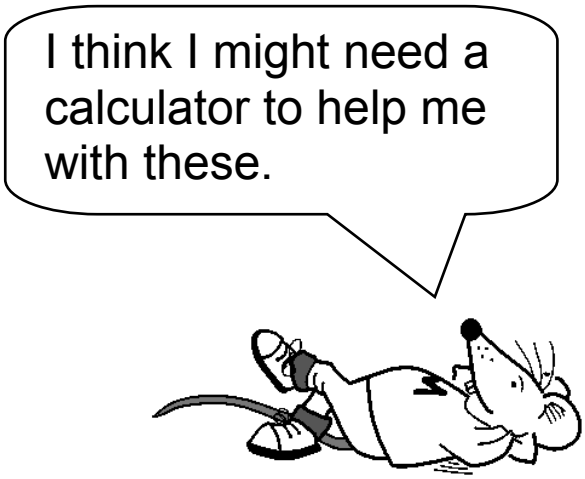
3. 2♦ – ♦2 = 10

4. 1♦ – ♦8 = 1

5. 2♦ – ♦5 = 5

Making sums and answers

2	4	5
+	x	=

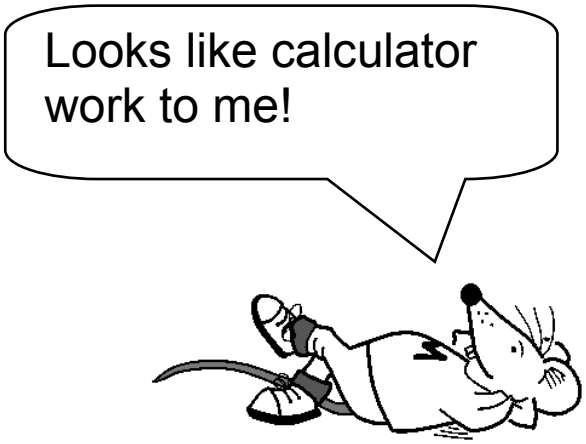


Only using the 2, 4, 5, +, x and =, how many different sums and answers can you make which have an answer between 40 and 200 ?
You can use each digit more than once.
Here's two to start you off:

45 x 2 = 90 and 5 x 5 x 5 = 125

Making sums and answers

2	5	10
+	x	=



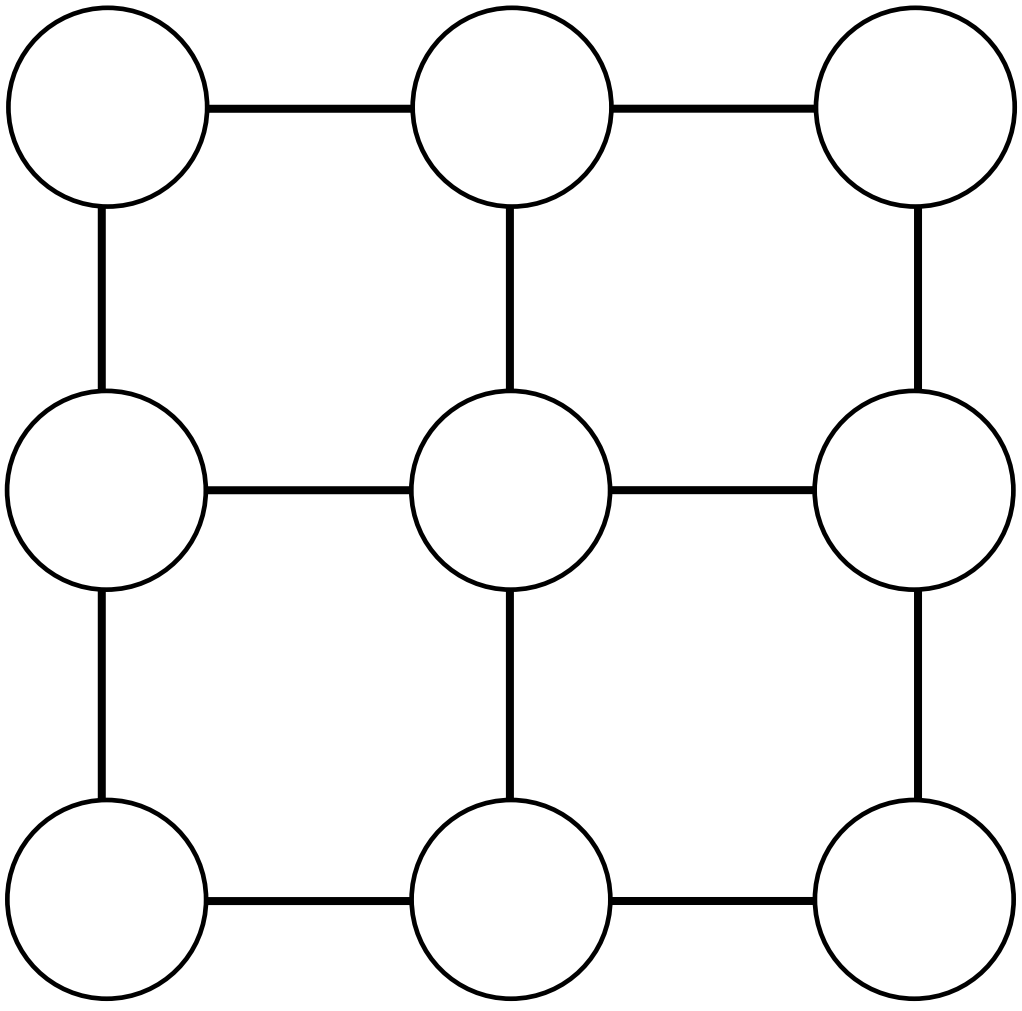
Only using the 2, 5, 10, +, x and =, how many different sums and answers can you make which have an answer from 50 to 1000 ?
You can use each digit more than once.
Here's two to start you off:

25 x 2 = 50 and 10 x 10 = 100

It's an odd world!

Can you put the numbers 1 to 9 in the circles so that the difference between each pair of joined numbers is odd?

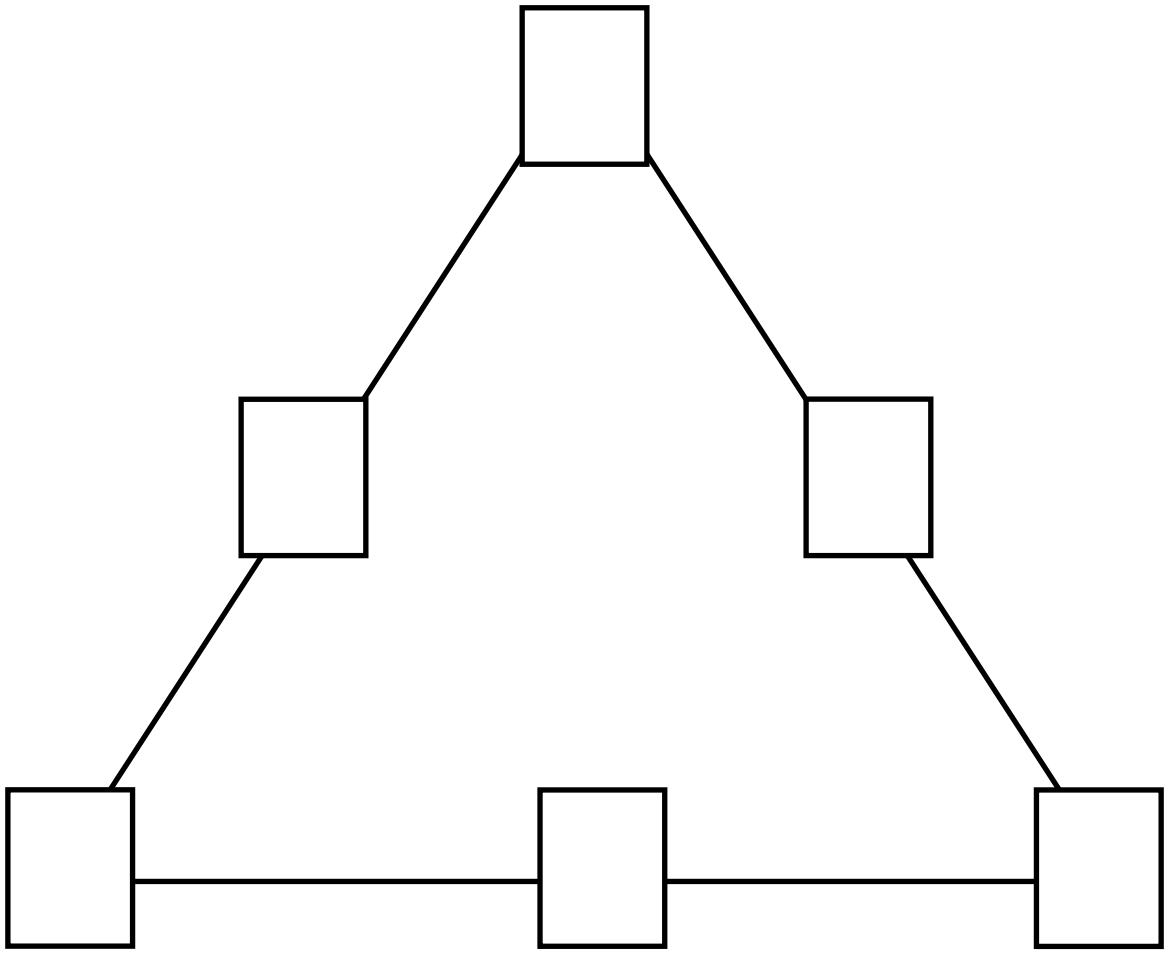
1	2	3	4	5	6	7	8	9



Magic triangle

1	2	3
4	5	6

Put the numbers 1 to 6 in the triangle so that each row adds up to 10.



Magic triangle

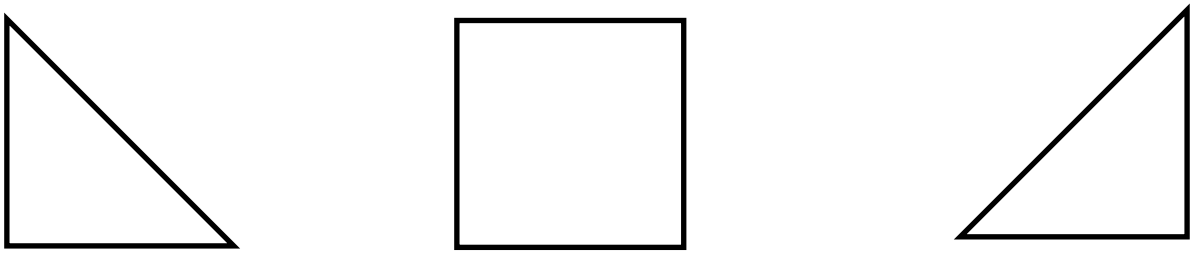
1	2	3
4	5	6

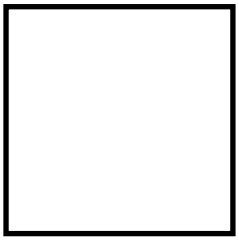
Now try and make other magic triangles so that each side adds up to 9, or maybe 11, you decide and have a go.

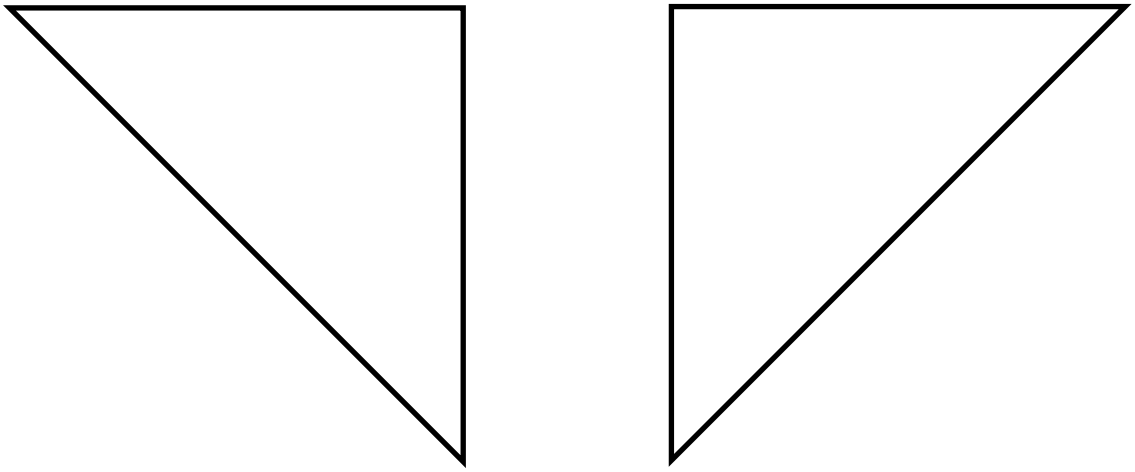
You could try with a different set of starting numbers.

Making symmetrical shapes

Cut out these shapes and fit them together to make symmetrical shapes of your own.

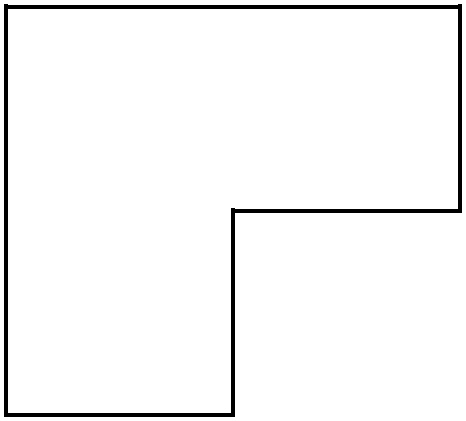


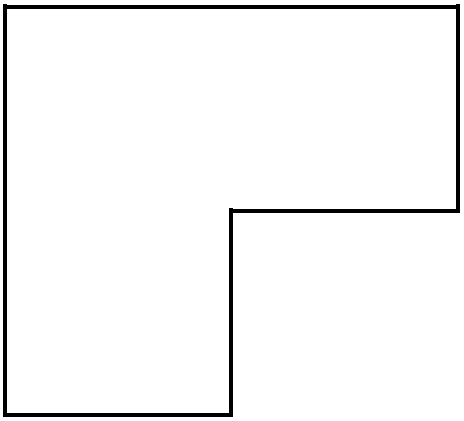


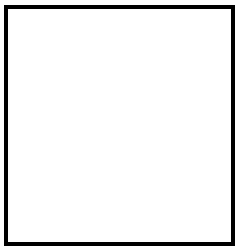


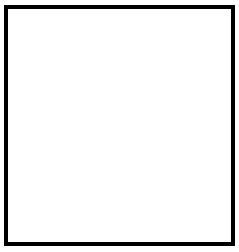
Making symmetrical shapes

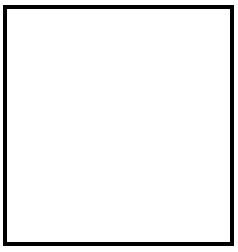
Cut out these shapes and fit them together to make symmetrical shapes of your own.

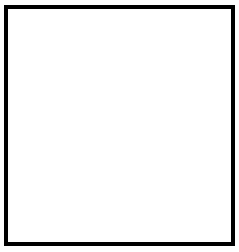








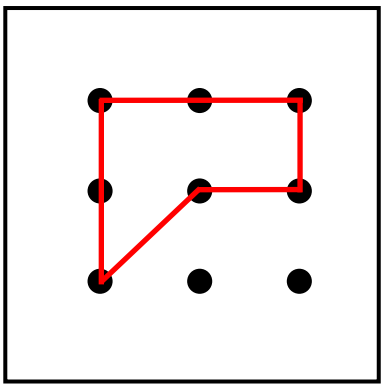


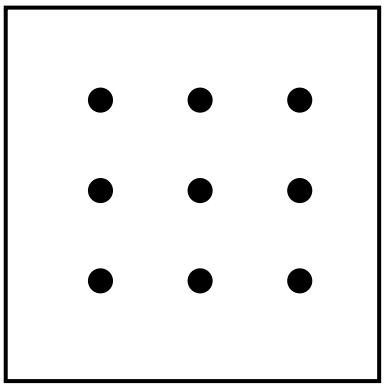


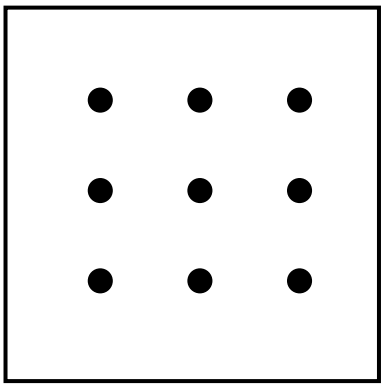
Making 5 sided shapes

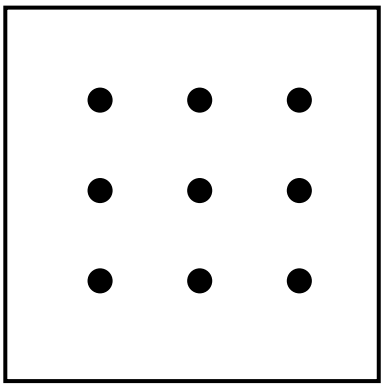
How many different five sided shapes can you make by joining the dots on the geoboards? 5 sided shapes are called pentagons.

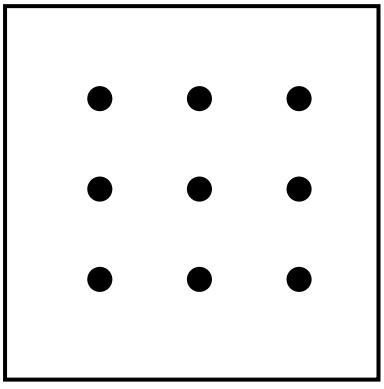
I have done one.
By the way, don't forget to use a ruler!

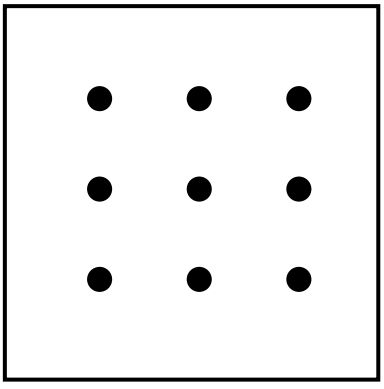


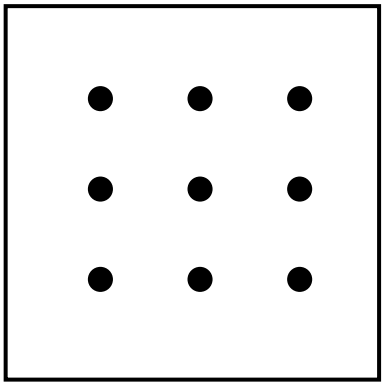






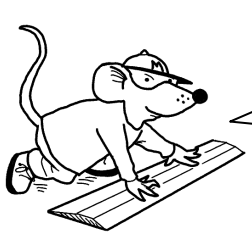




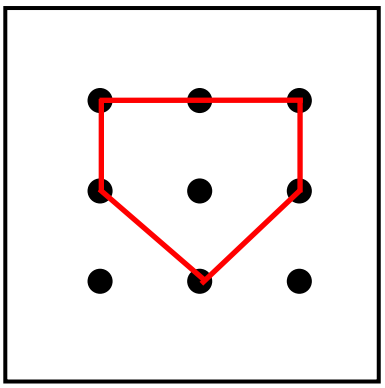


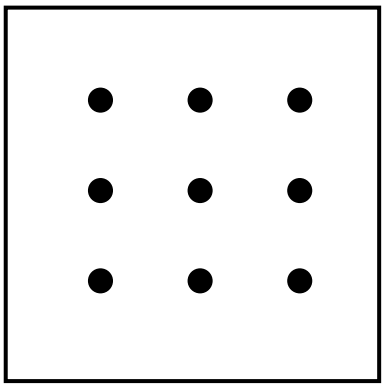
Making 5 or 6 sided shapes which are symmetrical

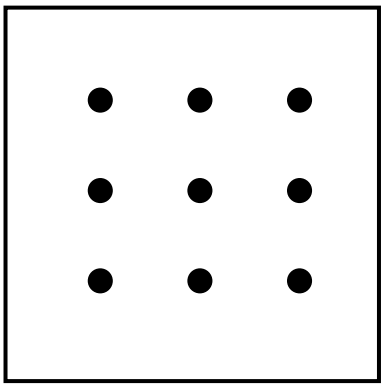
How many different five or six sided shapes which are symmetrical can you make by joining the dots on the geoboards? 6 sided shapes are called hexagons.

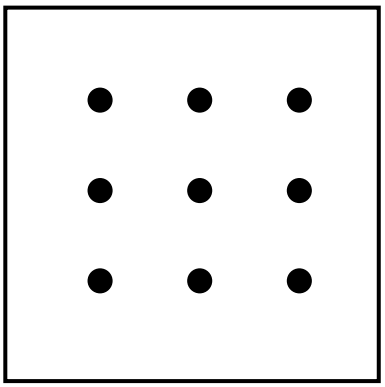


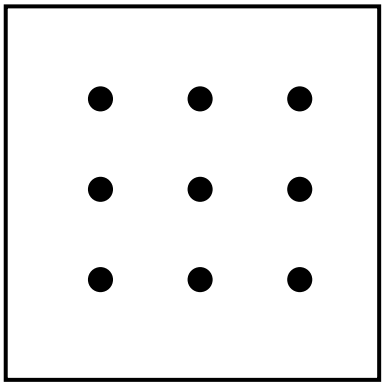
I have done one.
By the way, don't forget to use a ruler!

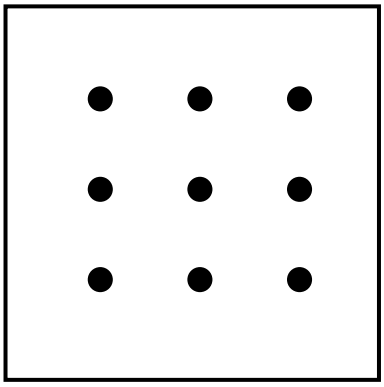


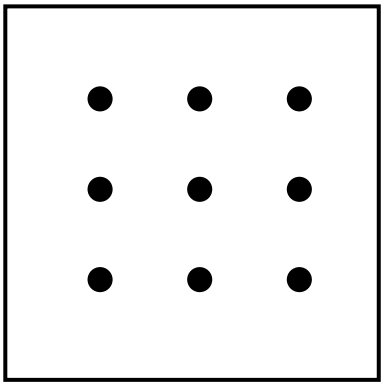






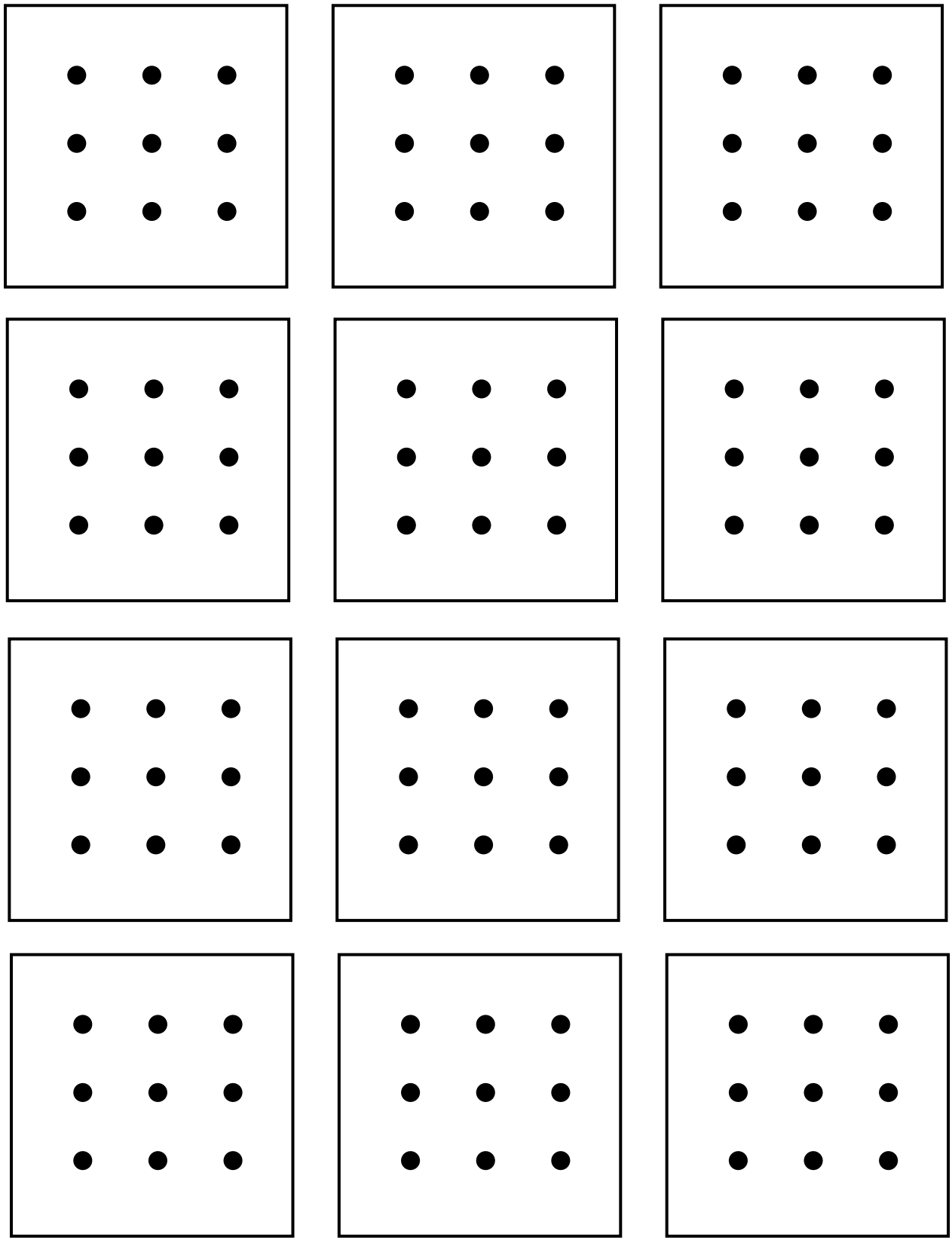




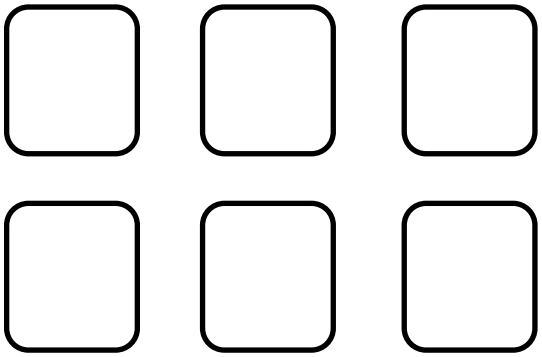


Now try shapes with six sides (hexagons).

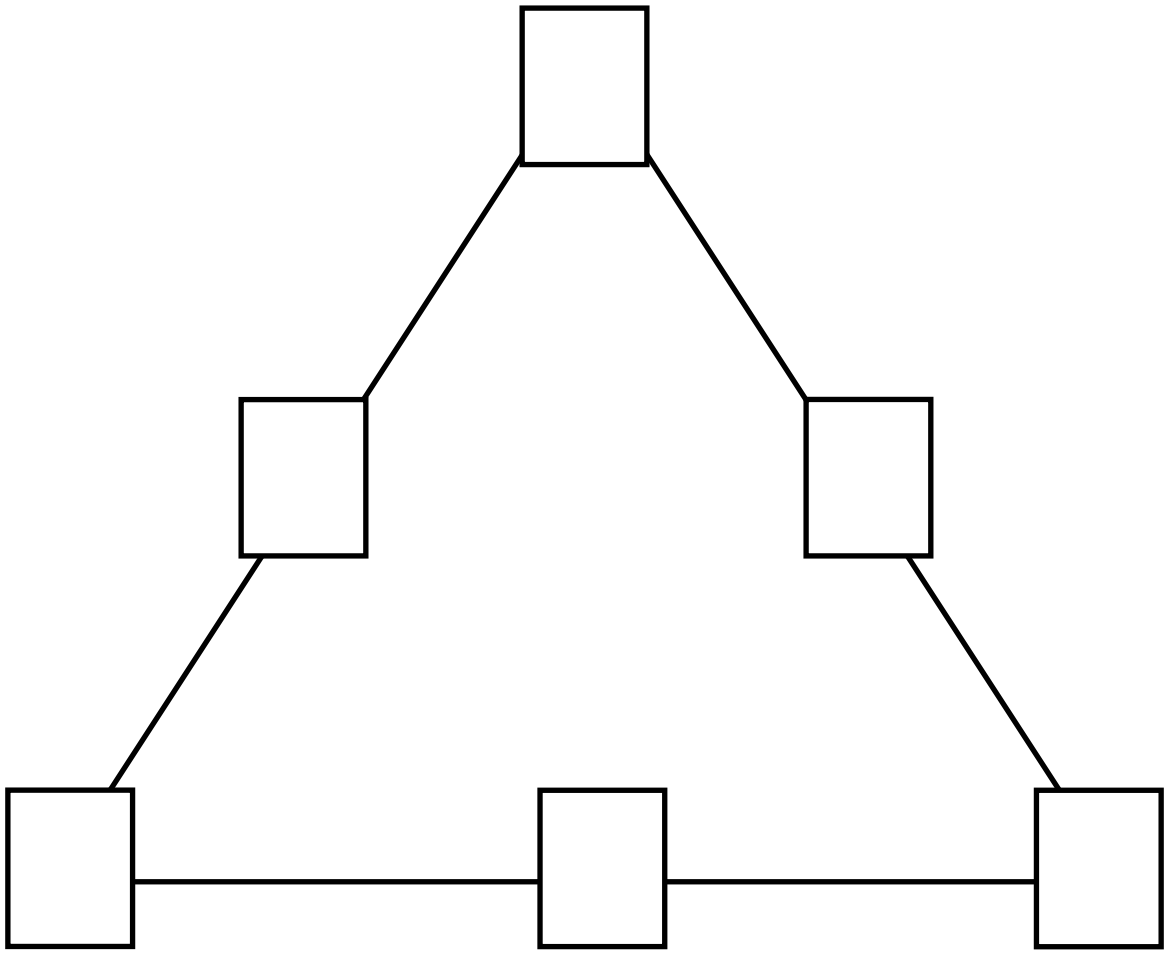
Geoboards



Magic triangle



Put these numbers into the triangle to make a total of



Answers

Page 8				
1. 4 and 5	**2.** 2 and 8	**3.** 5 and 10	**4.** 3 and 4	**5.** 5 and 7
Page 9				
1. 3 and 5	**2.** 2 and 7	**3.** 6 and 10	**4.** 3 and 7	**5.** 5 and 9
Page 10				
1. 13 + 12	**2.** 14 + 24	**3.** 16 - 12	**4.** 18 - 13	**5.** 20 - 11
Page 11				
1. 10 + 24	**2.** 11 + 25	**3.** 22 - 12	**4.** 19 - 18	**5.** 20 - 15