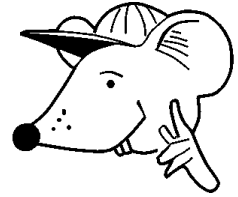




# MATHEMATICS



**N.S. Yr. 3 P.63**

**Solve mathematical puzzles and investigate.**

## Equipment

Paper, pencil, ruler

Dice, number cards, buttons/counters, boxes etc

# MathSphere

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## **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.

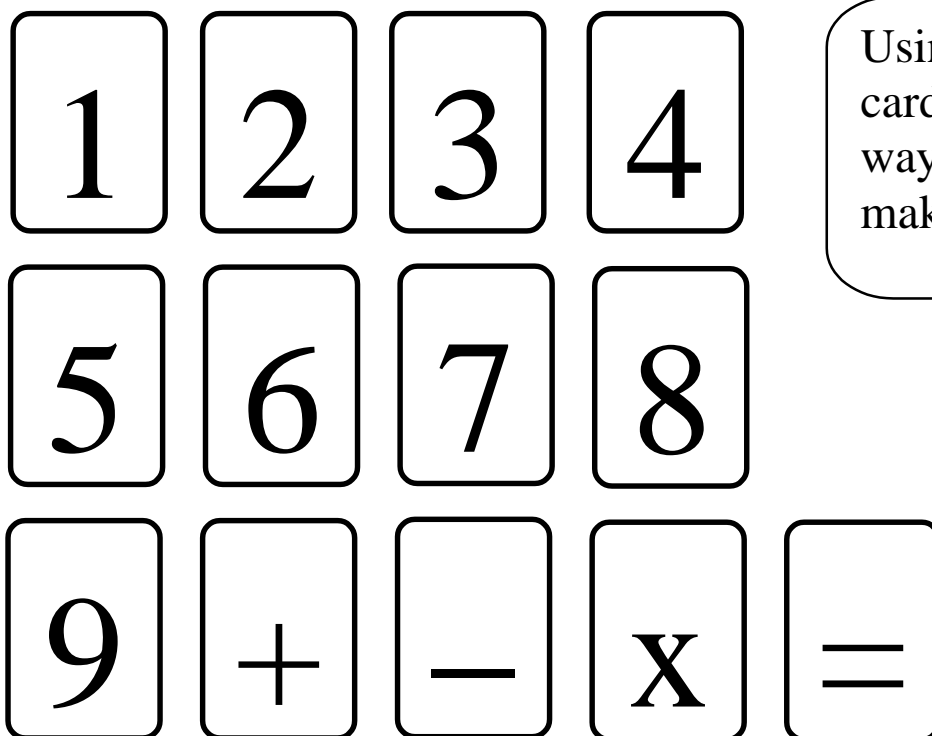
The questions on sum and product are closed and children will probably need reminding what the terms mean.

Exercise 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



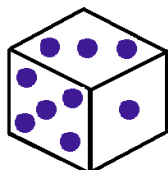
Using three cards, how many ways can you make 12?



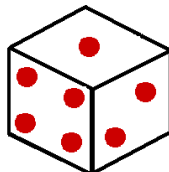
By using three cards together with some of the signs, how many ways can you make 12?

**I made 12 like this:**

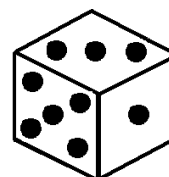
## Even numbers



Blue



Red



Black

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

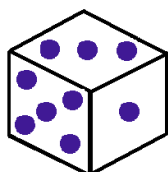
Record your answers below.



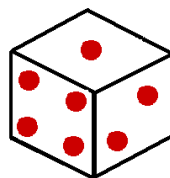
<u>Blue</u>	<u>Red</u>	<u>Black</u>	<u>Total is even</u>
+	+	=	
+	+	=	
+	+	=	
+	+	=	
+	+	=	
+	+	=	

You may need more paper to record your results.

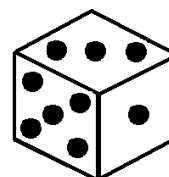
# Odd numbers



Blue



Red



Black

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

Record your answers below.



<u>Blue</u>	<u>Red</u>	<u>Black</u>	<u>Total is odd</u>
+	+		=
+	+		=
+	+		=
+	+		=
+	+		=
+	+		=
+	+		=

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

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

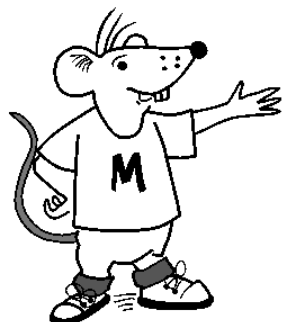
Make 16 by adding  
four even numbers  
only.

How many different  
ways can you do it?



**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?



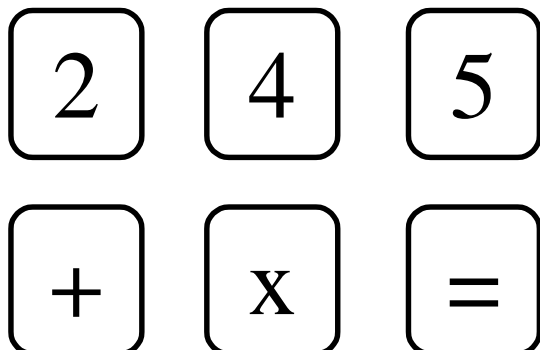
1.  $1♦ + ♦4 = 34$

2.  $1♦ + ♦5 = 36$

3.  $2♦ - ♦2 = 10$

4.  $1♦ - ♦8 = 1$

5.  $2♦ - ♦5 = 5$

**Making sums and answers**

I think I might need a calculator to help me with these.

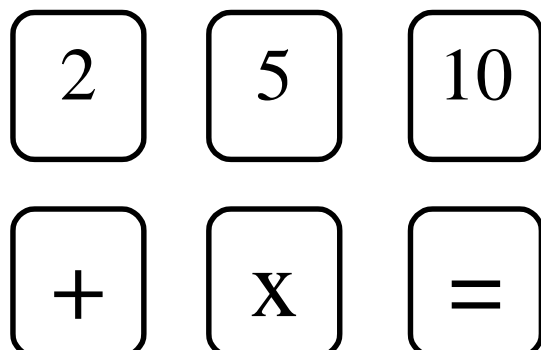


**Only using the 2, 4, 5, +, x and =, how many different sums and answers can you make which have an answer between 40 and 200 ?**

**You can use each digit more than once.**

**Here's two to start you off:**

$$45 \times 2 = 90 \quad \text{and} \quad 5 \times 5 \times 5 = 125$$

**Making sums and answers**

Looks like calculator  
work to me!



**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:**

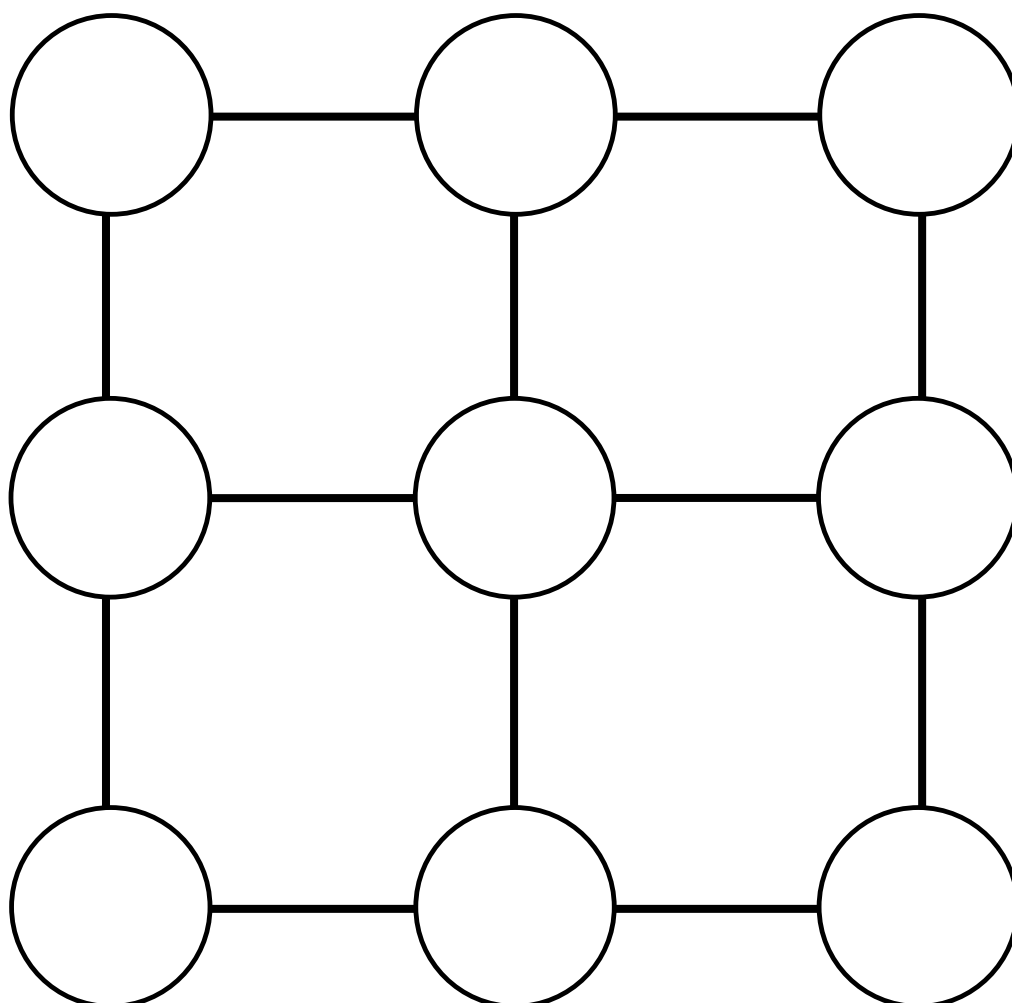
$$25 \times 2 = 50 \quad \text{and} \quad 10 \times 10 = 100$$

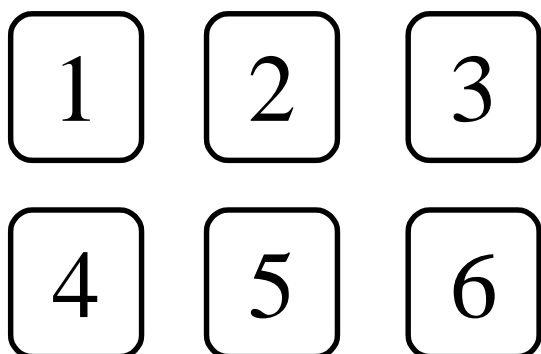
**It's an odd world!**

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

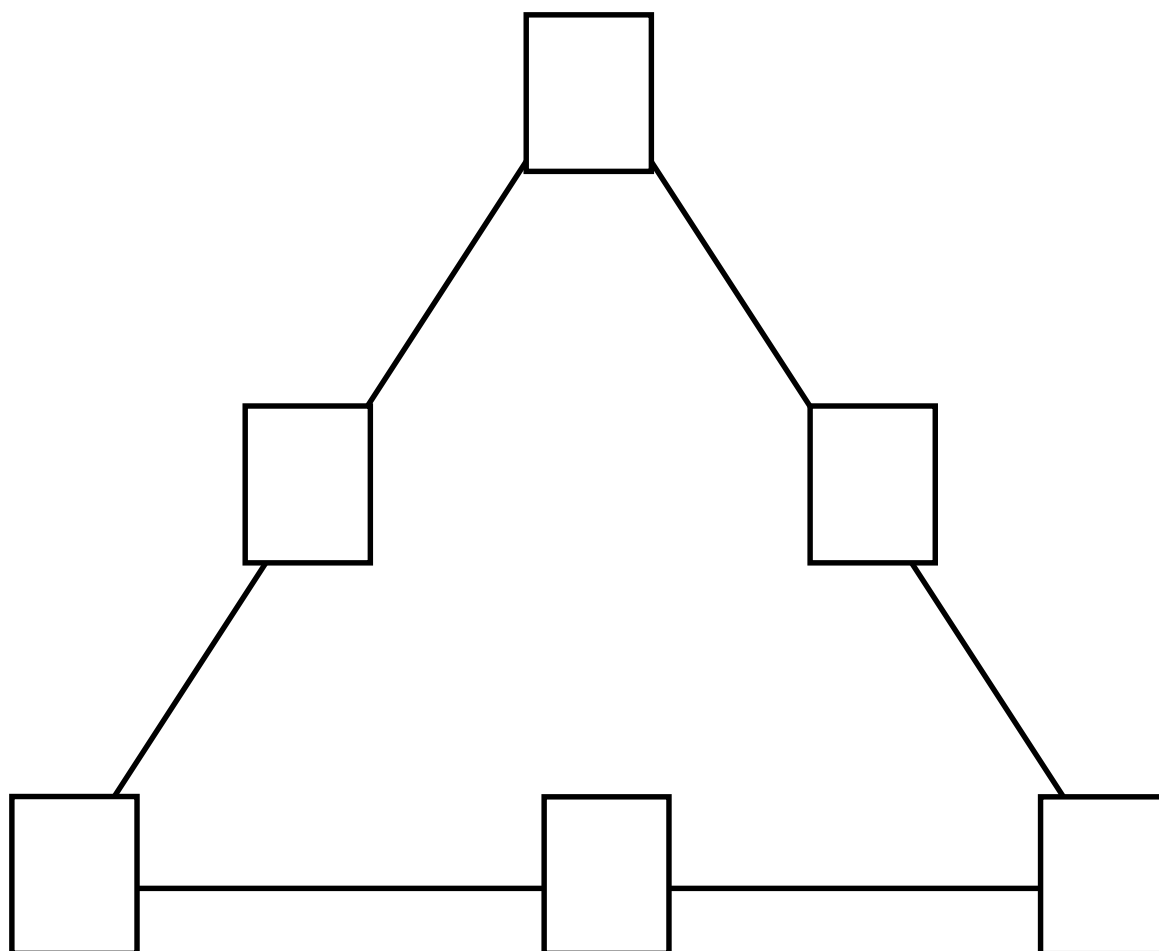


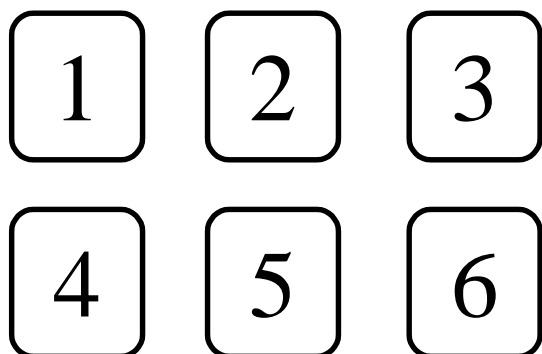
1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---



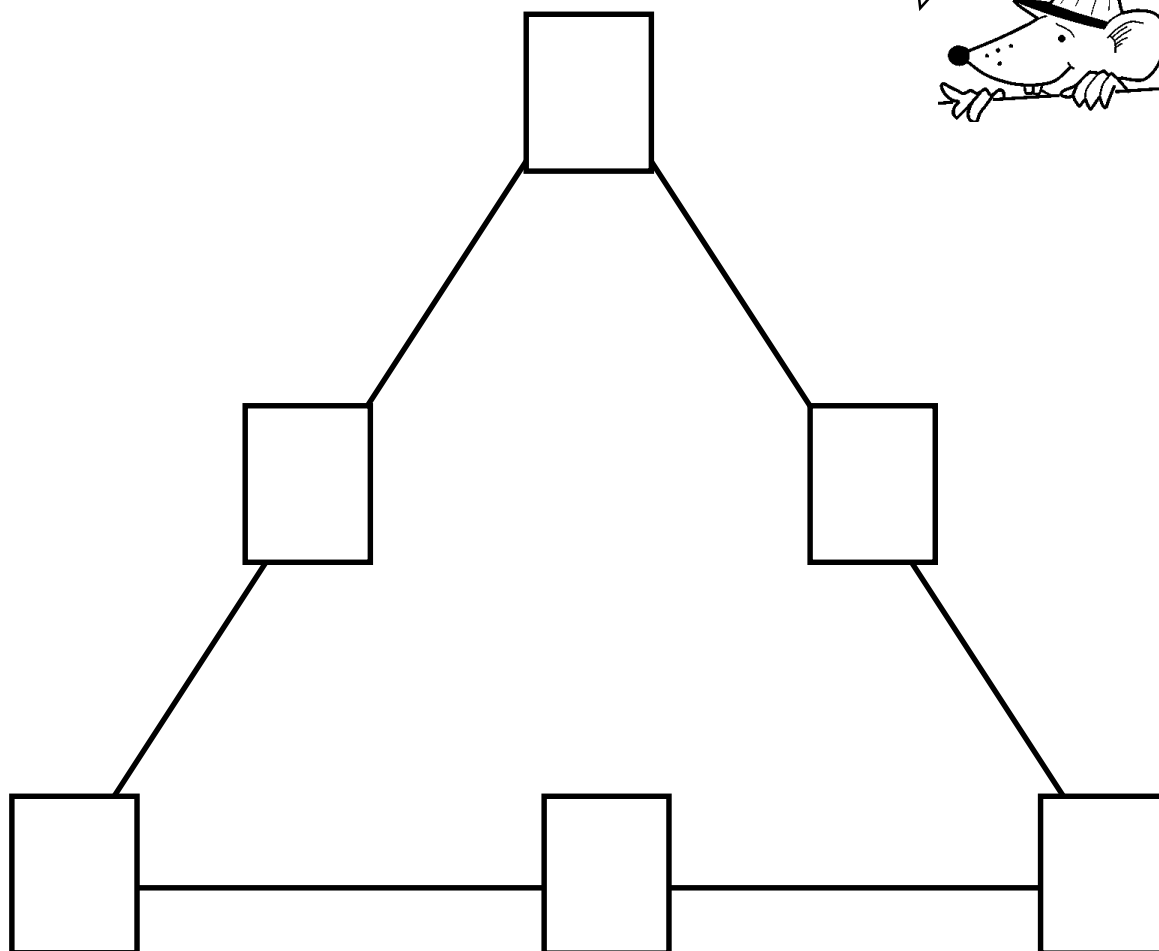
**Magic triangle**

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



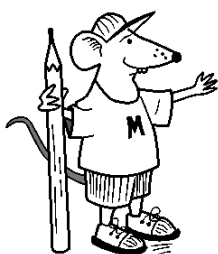
**Magic triangle**

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

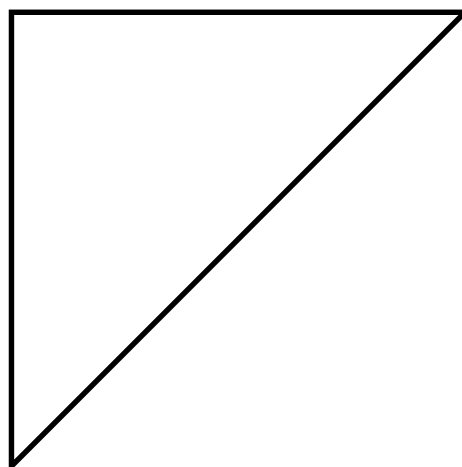
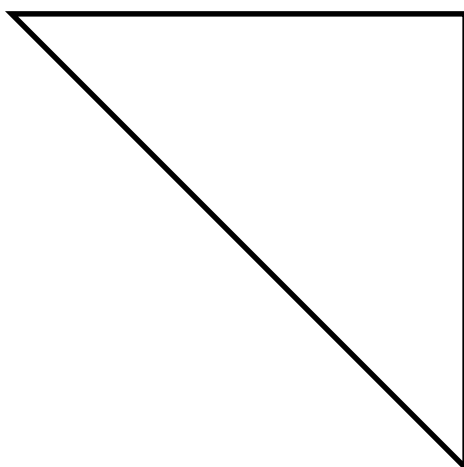
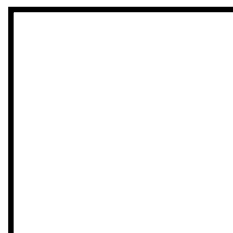
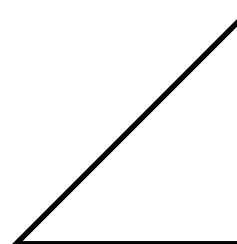
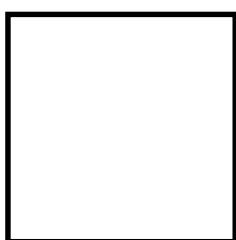
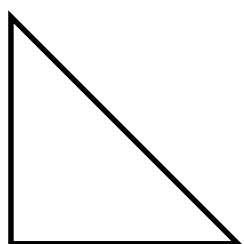


You could try with a different set of starting numbers.



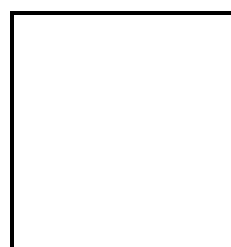
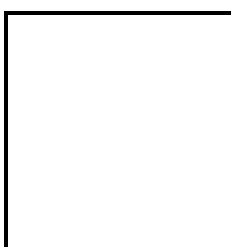
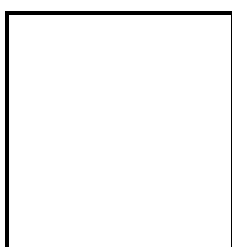
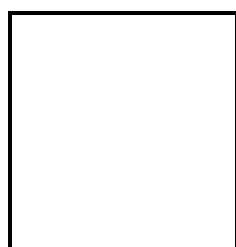
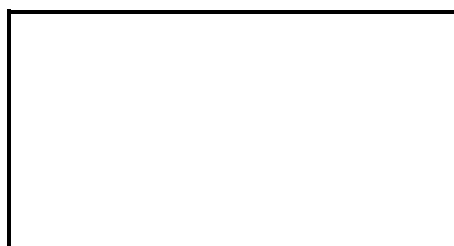
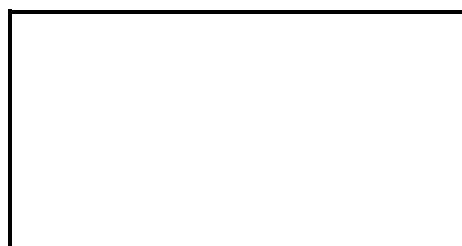
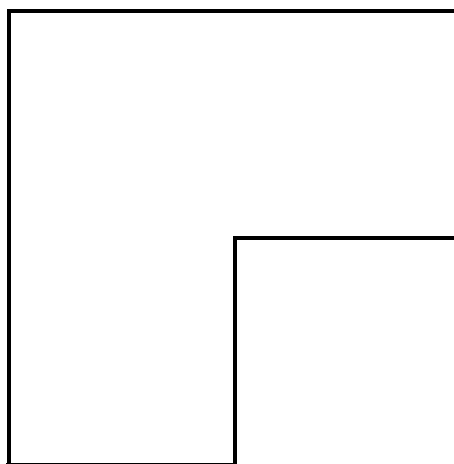
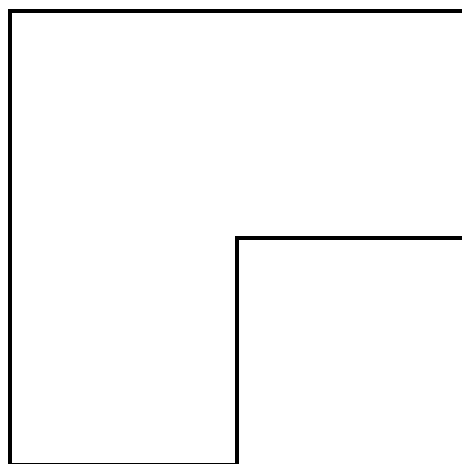
**Making symmetrical shapes**

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.

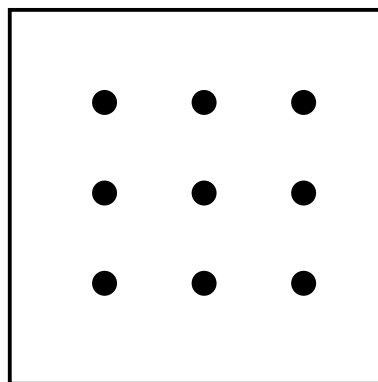
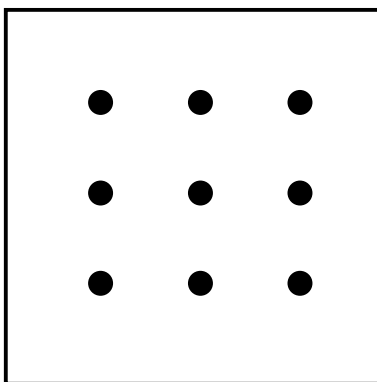
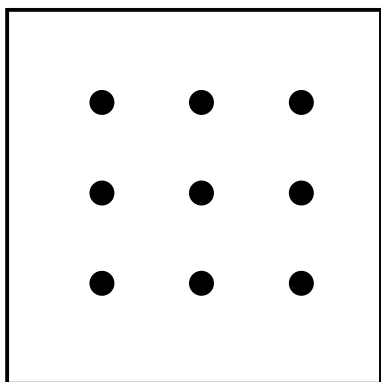
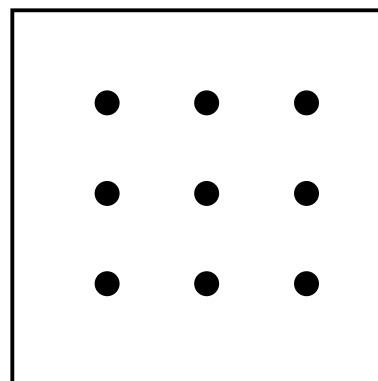
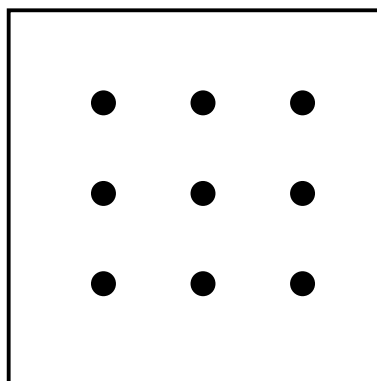
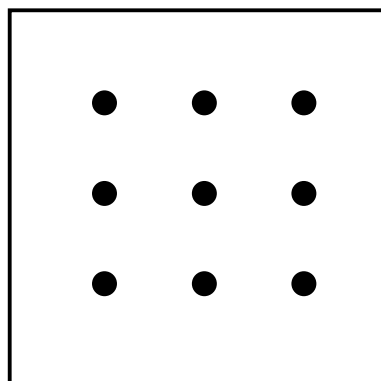
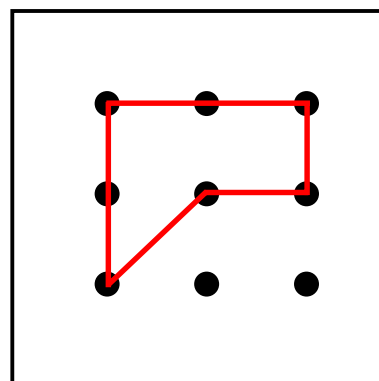


### Making 5 sided shapes

**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!

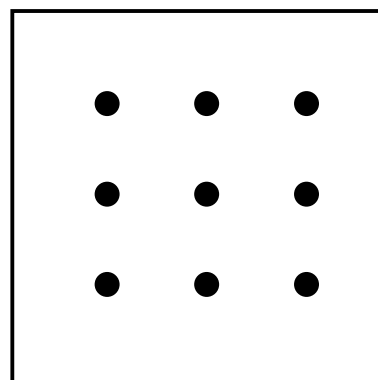
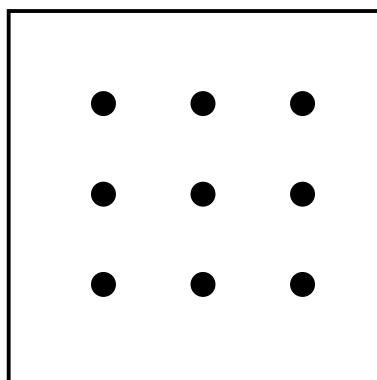
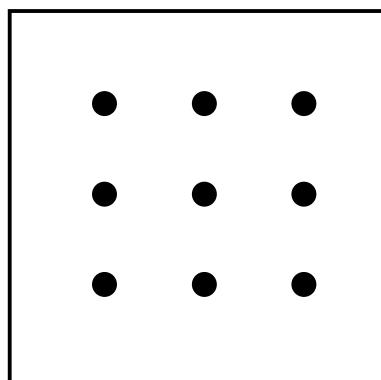
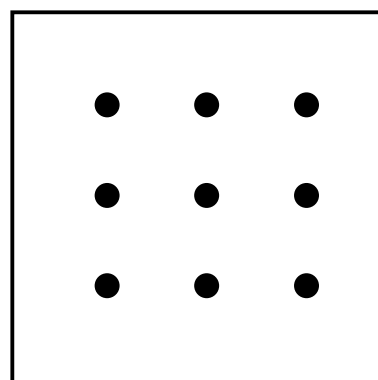
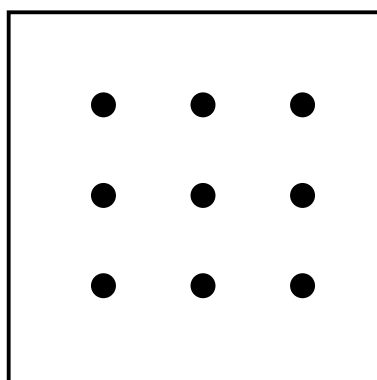
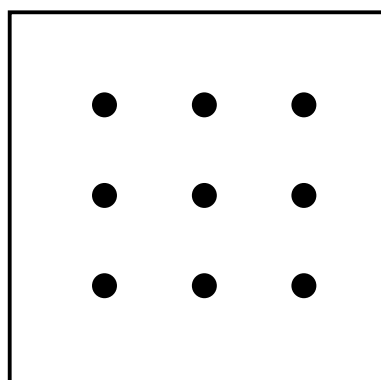
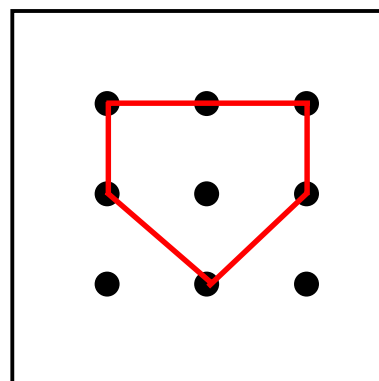


**Making 5 or 6 sided shapes which are symmetrical**

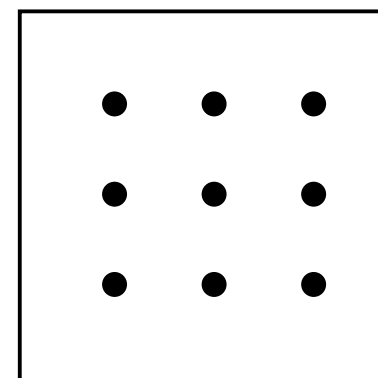
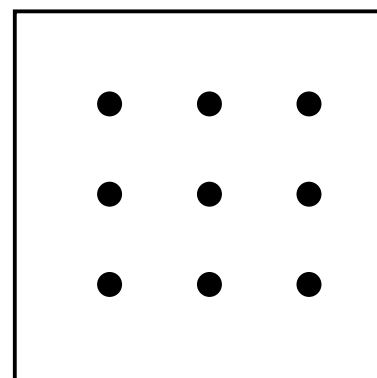
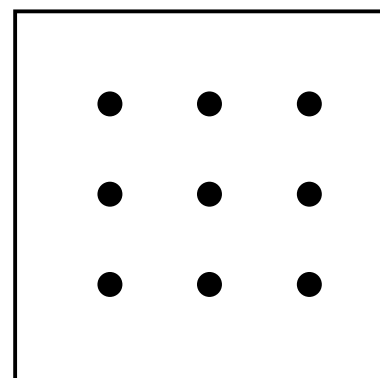
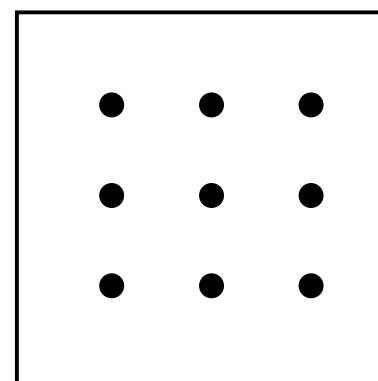
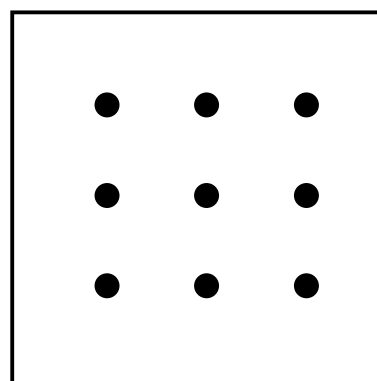
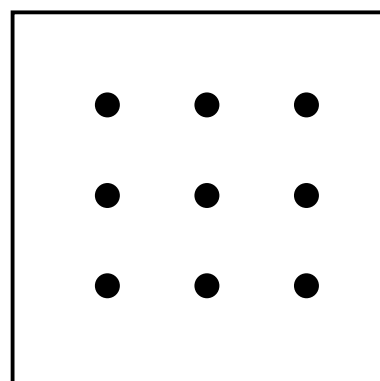
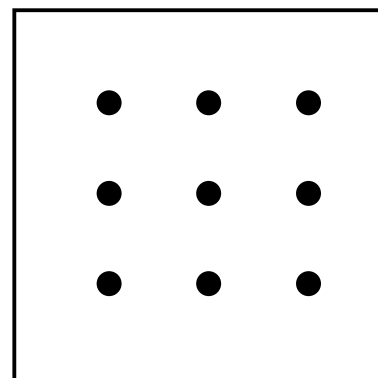
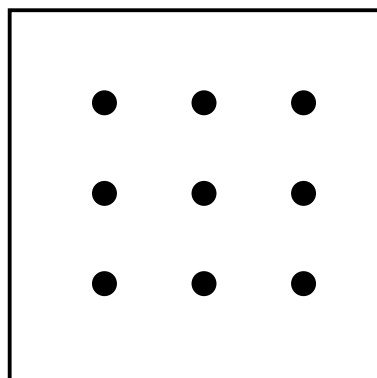
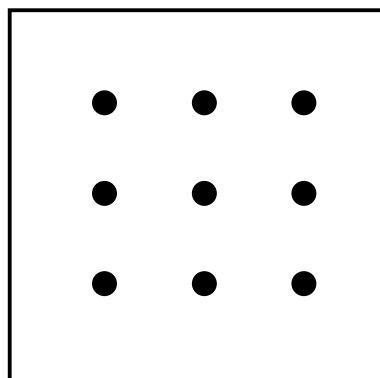
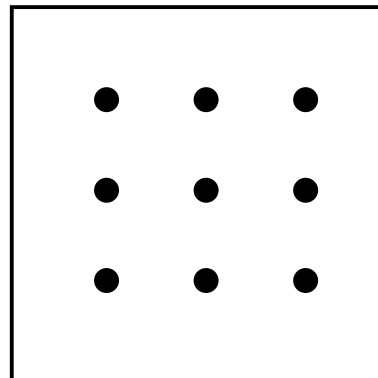
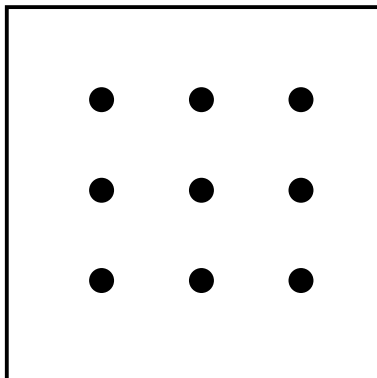
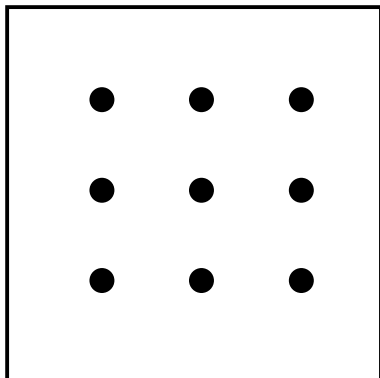
**How many different five sided shapes can you make by joining the dots on the geoboards? 5 sided shapes are called pentagons.**



I have done one.  
By the way,  
don't forget to  
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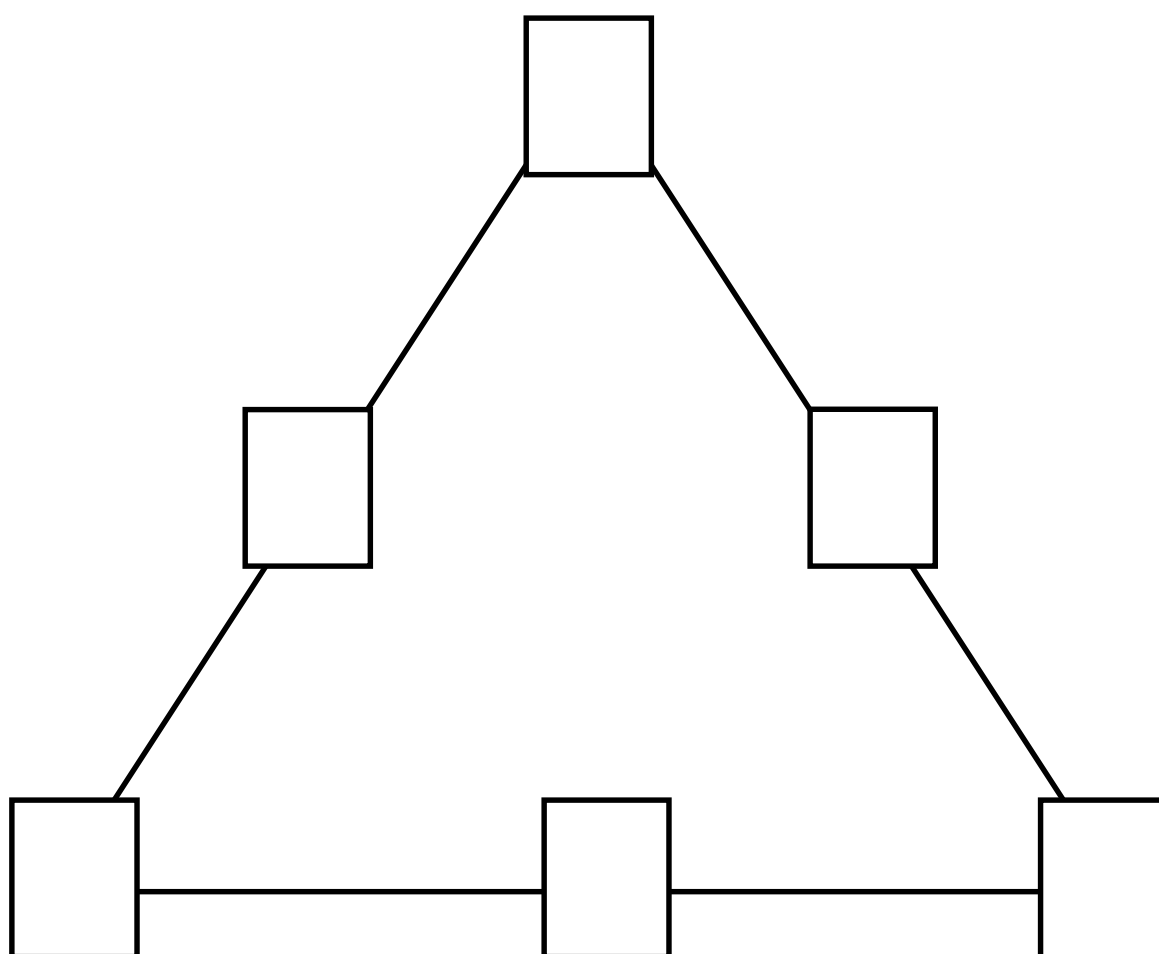


**Now try shapes with six sides ( hexagons).**

Geoboards

**Magic triangle**


Put these numbers into  
the triangle to make a  
total of



**Answers**

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