

Mathematical challenges for able pupils

Year 2 B Securing number
facts, understanding shape



Sum up

Choose from these four cards.

Make these totals:



What other totals can you make from the cards?

Learning Objective:

- Solve mathematical problems or puzzles.
- Know addition and subtraction facts to at least 10.
- Add three small numbers mentally.

Solution to the Sum Up problem.

If each number can be used only once:

$$9 = 2 + 3 + 4$$

$$10 = 2 + 8$$

$$11 = 3 + 8$$

$$12 = 4 + 8$$

$$13 = 2 + 3 + 8$$

$$14 = 2 + 4 + 8$$

$$15 = 3 + 4 + 8$$

Other solutions are possible if numbers can be repeated.

Other totals:

$$5 = 2 + 3$$

$$6 = 2 + 4$$

$$7 = 3 + 4$$

$$17 = 2 + 3 + 4 + 8$$

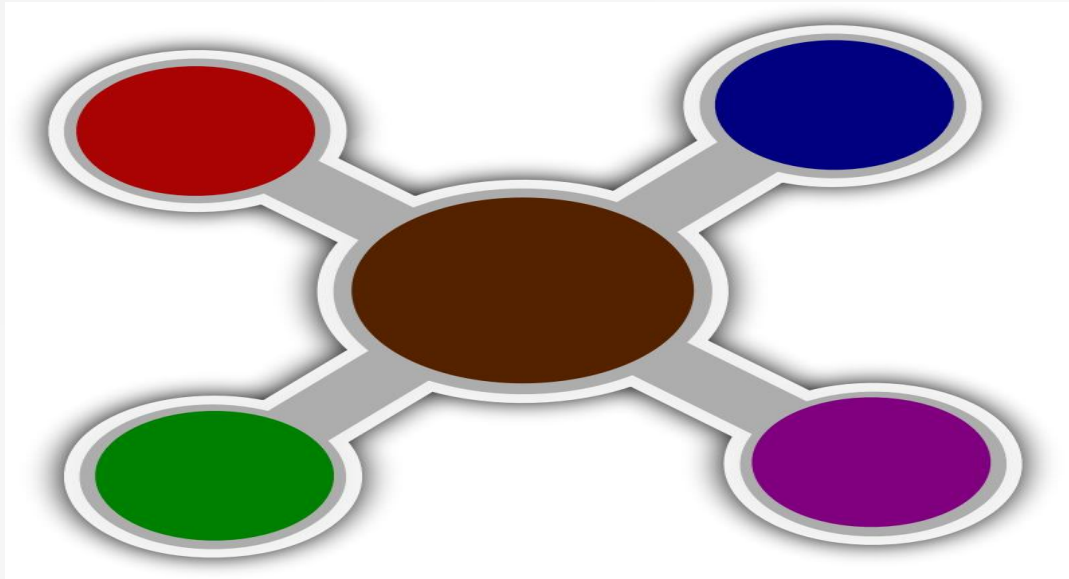
Learning Objective:

- Solve mathematical problems or puzzles.
- Know addition and subtraction facts to at least 10.
- Add three small numbers mentally.

Cross Roads

Use 15 counters.

Put a different number on each plate.



Do it
Make each
again.
line add
This time
up to 10.
make
each line
add up to
8.

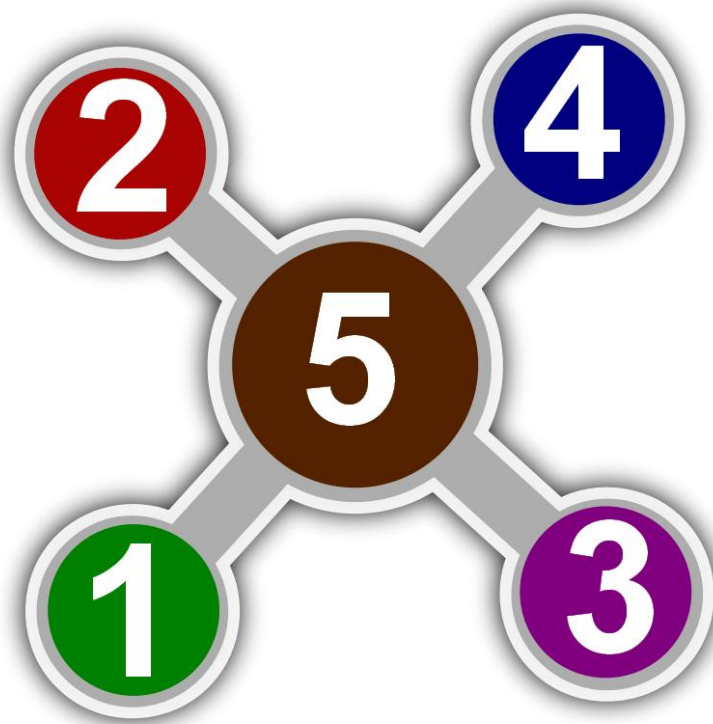
Learning Objective:

- Solve mathematical problems or puzzles.
- Know addition and subtraction facts up to 10.
- Add three small numbers mentally.

Solution to Cross Roads

Each line adds
up to 10.

Each line
adds up to 8.

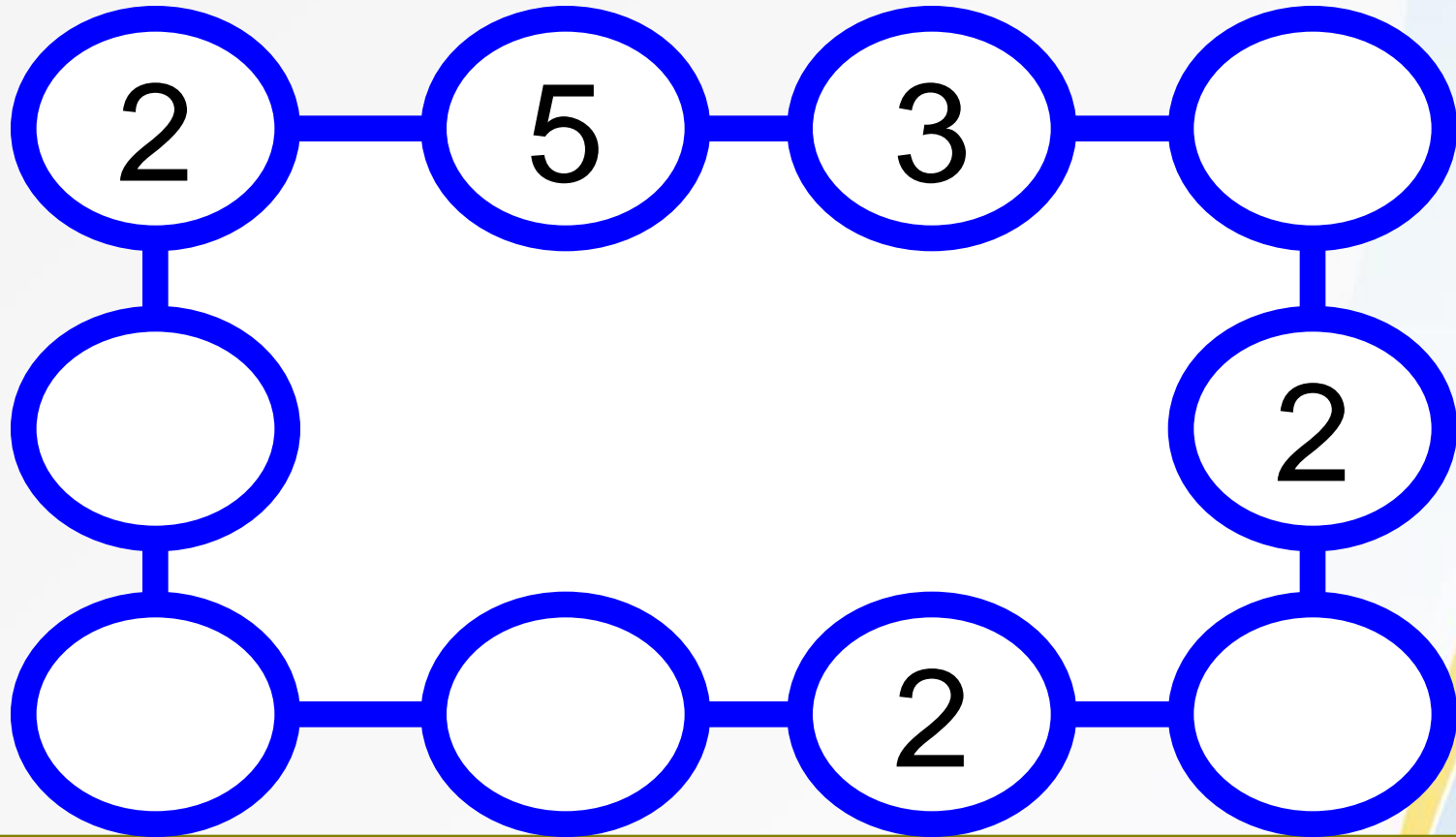


Learning Objective:

- Solve mathematical problems or puzzles.
- Know addition and subtraction facts up to 10.
- Add three small numbers mentally.

Number lines

1. Make each line add up to 16.

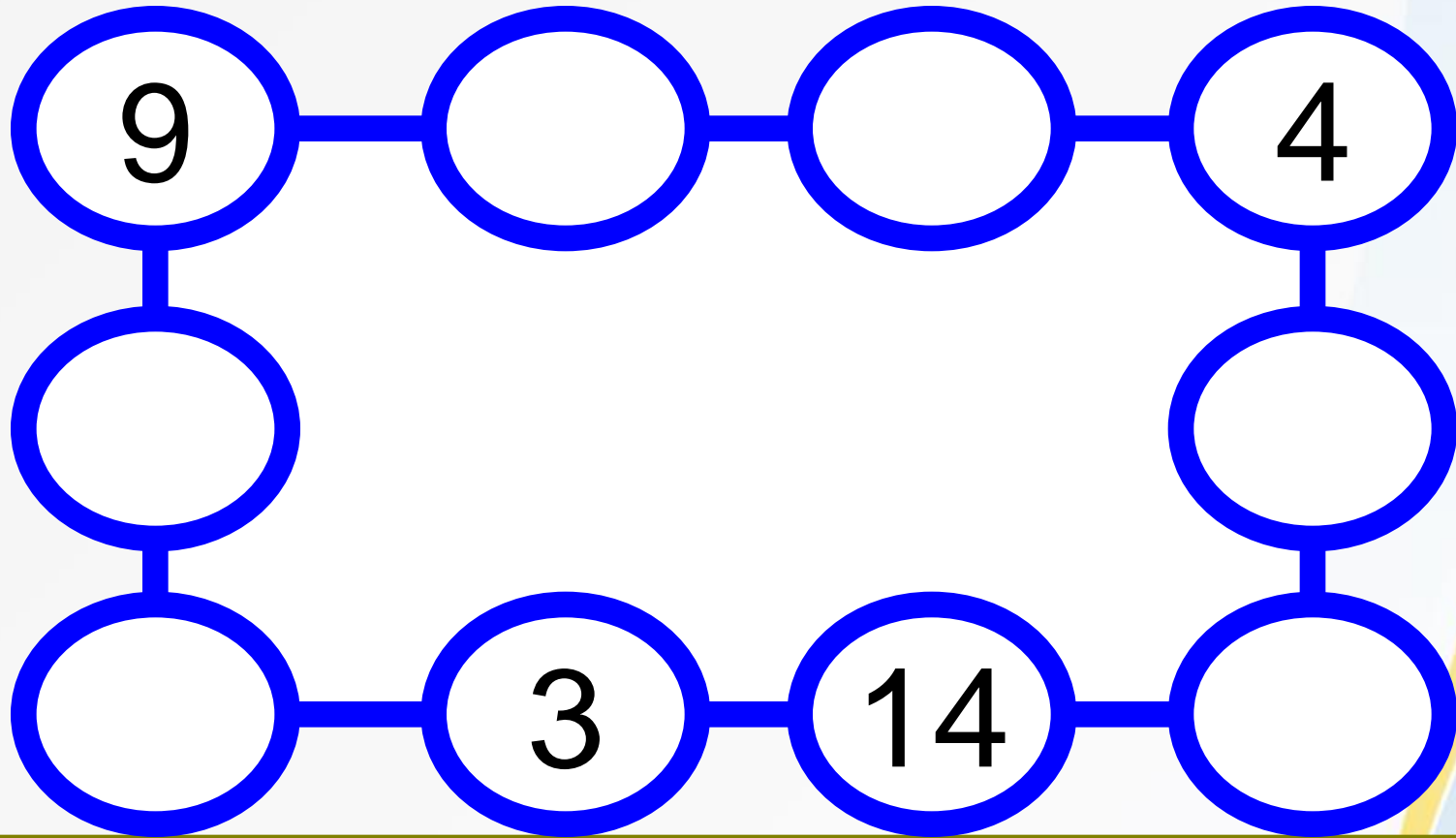


Learning Objective:

- Solve mathematical problems or puzzles.
- Know addition and subtraction facts up to 20.
- Add three small numbers mentally.

Number lines

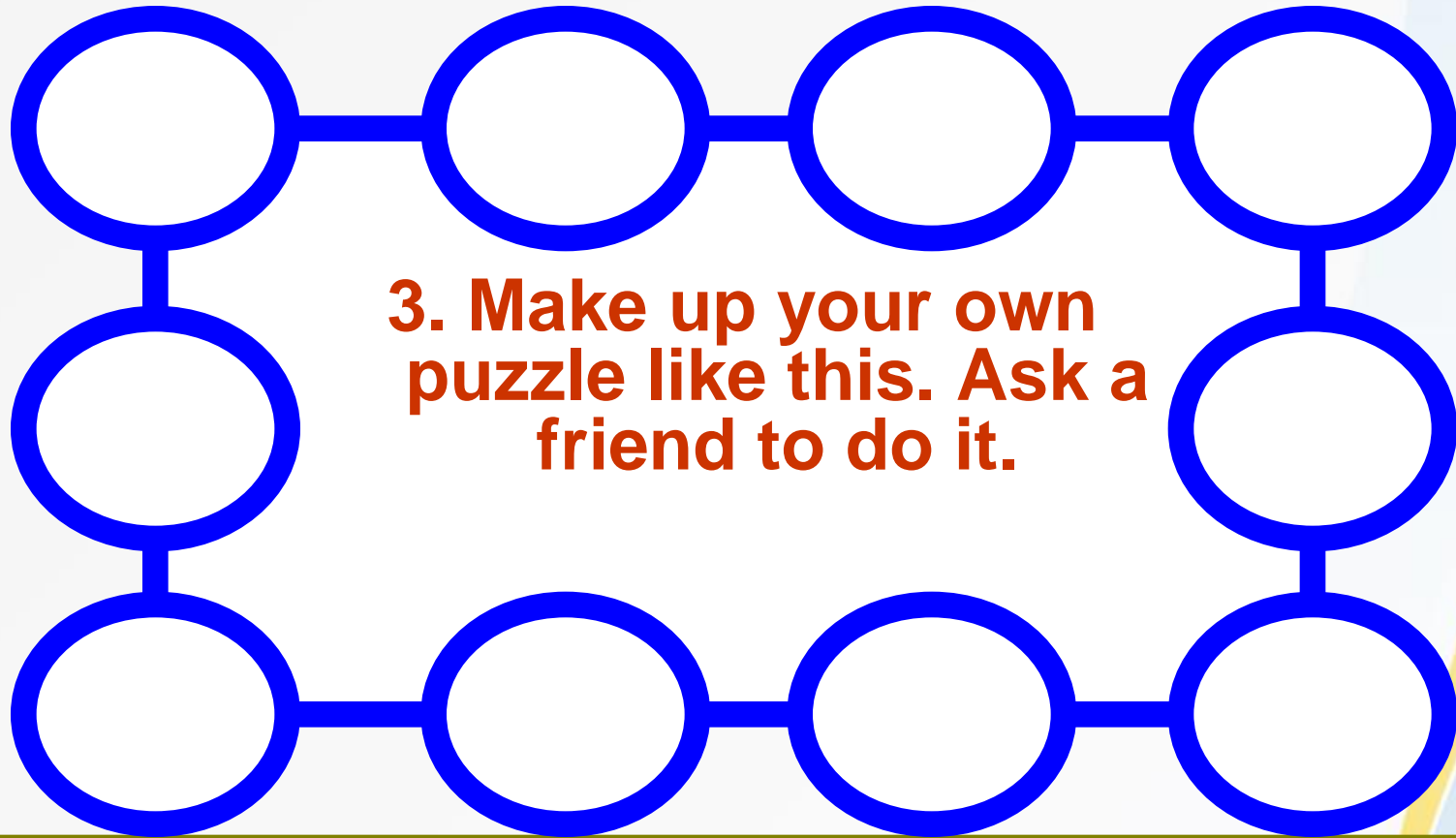
2. Make each line add up to 20.



Learning Objective:

- Solve mathematical problems or puzzles.
- Know addition and subtraction facts up to 20.
- Add three small numbers mentally.

Number lines



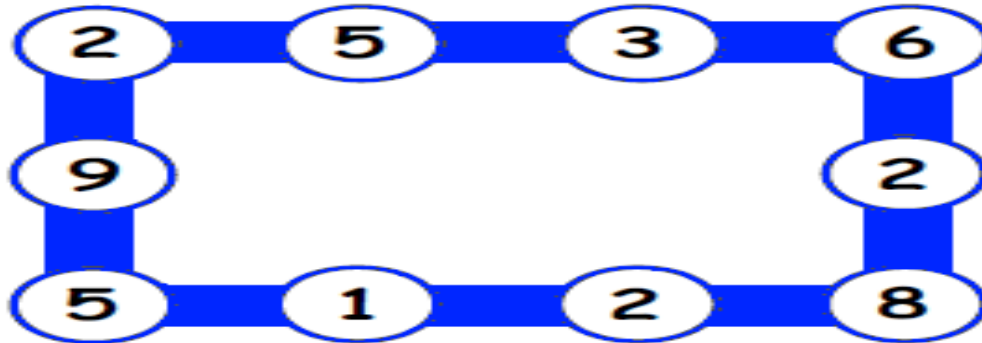
3. Make up your own puzzle like this. Ask a friend to do it.

Learning Objective:

- Solve mathematical problems or puzzles.
- Know addition and subtraction facts up to 20.
- Add three small numbers mentally.

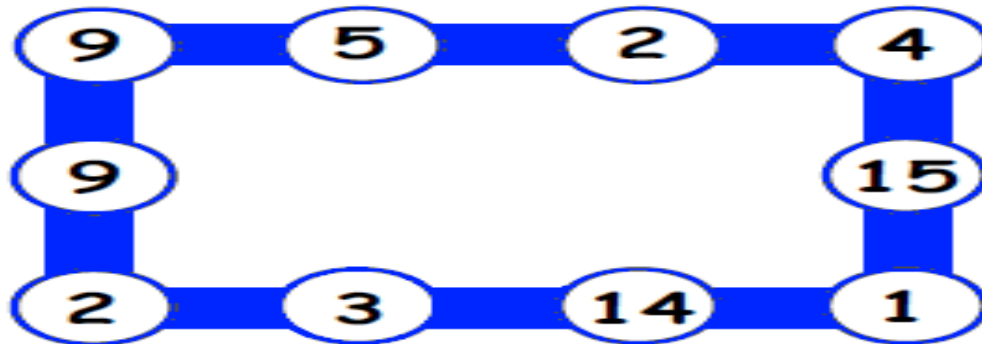
Solution for Number lines

1. For example:



Other solutions are possible.

2. For example:



Learning Objective:

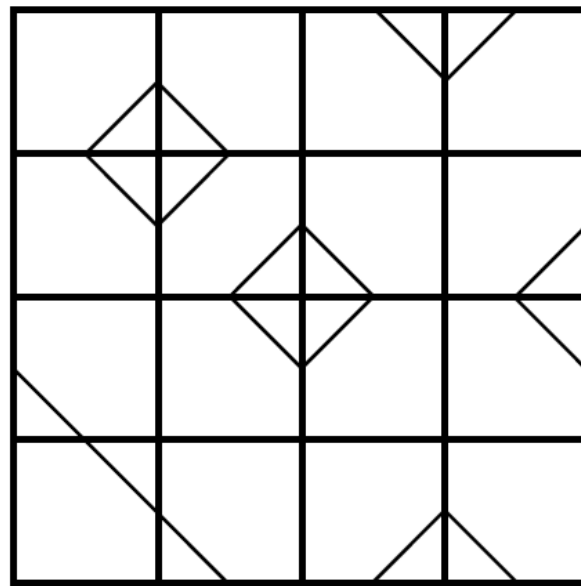
- Solve mathematical problems or puzzles.
- Know addition and subtraction facts up to 20.
- Add three small numbers mentally.

Odd one out

1. Here is a grid of 16 squares.

One square is different from all the others.

Mark it on the grid.

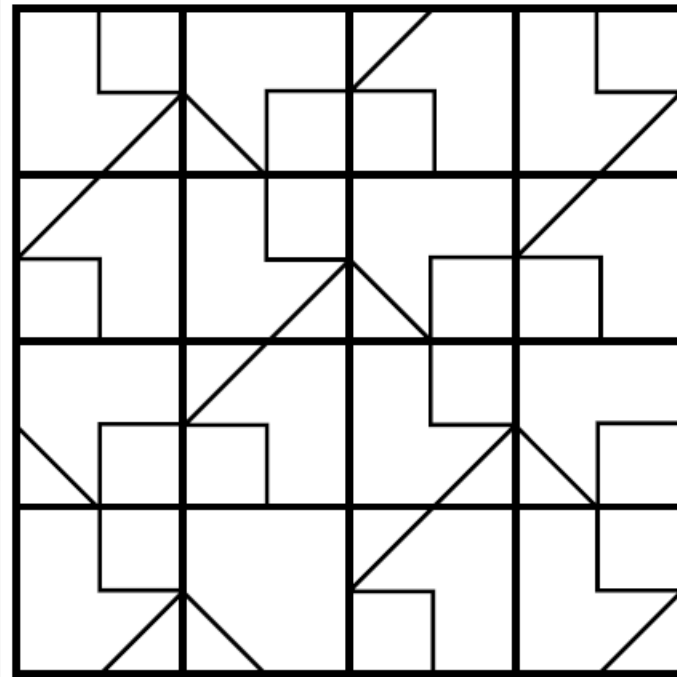


Learning Objective:

- Solve mathematical problems or puzzles.
- Make and describe patterns and pictures.

Odd one out

**2. Here is another a grid of 16 squares.
One square is different from all the
others. Mark it on the grid.**

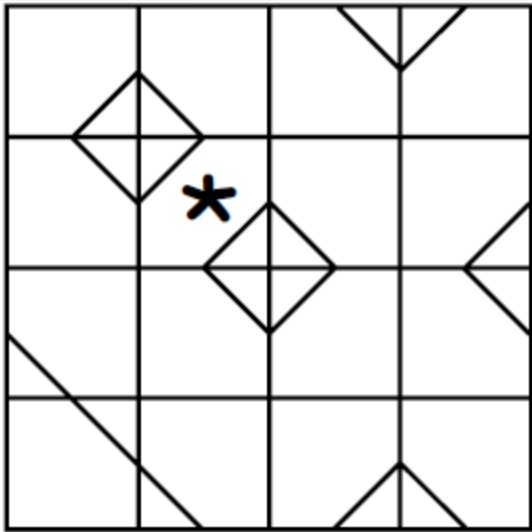


Learning Objective:

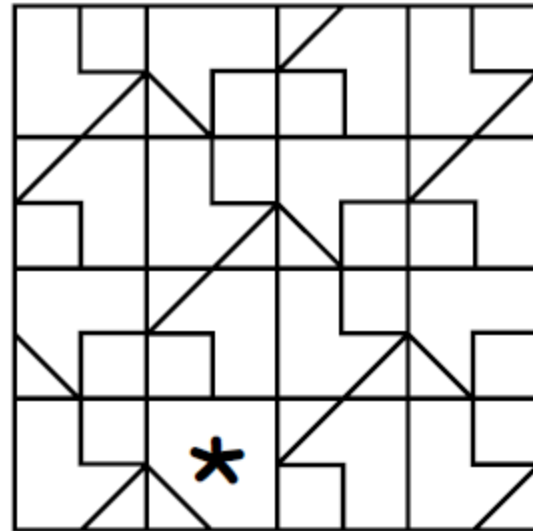
- Solve mathematical problems or puzzles.
- Make and describe patterns and pictures.

Solution to Odd one out.

1.



2.



Learning Objective:

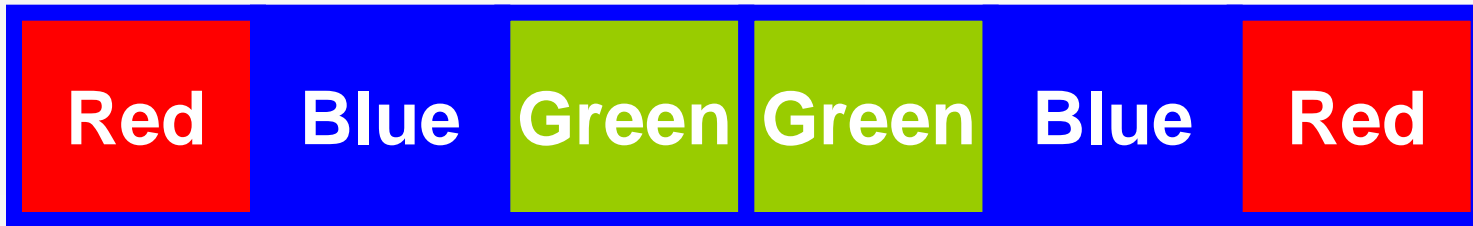
- Solve mathematical problems or puzzles.
- Make and describe patterns and pictures.

Line of symmetry - 6 squares

Gopal had six squares: two red, two green, two blue.

He put them in a line.

The squares made a symmetrical pattern.



Arrange six squares in a line.

Make two squares red, two green and two blue.

Make the line of squares symmetrical.

How many different lines can you make like this?

Learning Objective:

- Solve mathematical problems or puzzles.
- Begin to recognise line symmetry.
- Solve a problem by sorting, classifying and organising information.

Solution for 6 Square line of symmetry

There are five other ways for Gopal to arrange the squares:

red, green, blue, blue, green, red
green, red, blue, blue, red, green
green, blue, red, red, blue, green
blue, red, green, green, red, blue
blue, green, red, red, green, blue

Learning Objective:

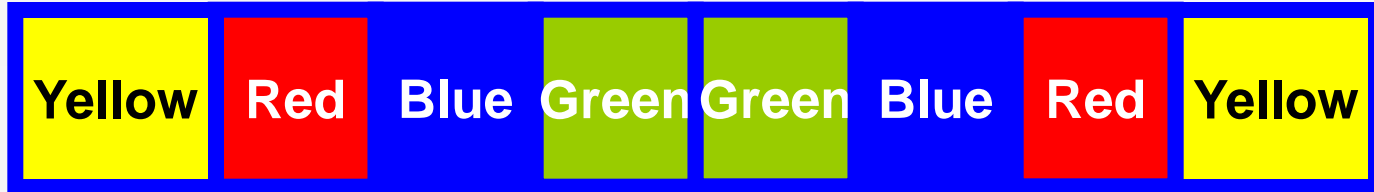
- Solve mathematical problems or puzzles.
- Begin to recognise line symmetry.
- Solve a problem by sorting, classifying and organising information.

Line of symmetry - Eight squares

Gopal had eight squares: two red, two green, two blue, two yellow

He put them in a line.

The squares made a symmetrical pattern.



Arrange eight squares in a line.

Make two squares red, two green, two blue and two yellow.

Make the line of squares symmetrical.

How many different lines can you make like this?

Learning Objective:

- Solve mathematical problems or puzzles.
- Begin to recognise line symmetry.
- Solve a problem by sorting, classifying and organising information.

Solution for Eight square line of symmetry

What if Gopal has eight squares: two red, two blue, two green and two yellow?

How many different symmetrical lines can he make now?

(24)

Learning Objective:

- Solve mathematical problems or puzzles.
- Begin to recognise line symmetry.
- Solve a problem by sorting, classifying and organising information.

Birds' eggs

- Three birds laid some eggs.
- Each bird laid an odd number of eggs.
- Altogether they laid 19 eggs.



How many eggs did each bird lay?
Find different ways to do it.

Learning Objective:

- Solve mathematical problems or puzzles.
- Recognise odd and even numbers.
- Add three small numbers mentally.

There are 10 possibilities:

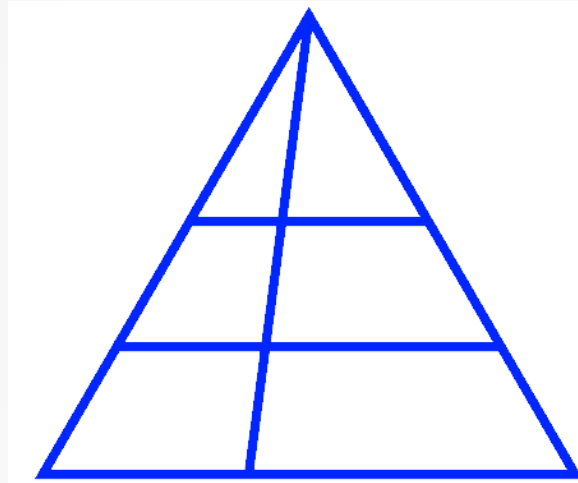
1, 1, 17 **1, 7, 11** **3, 3, 13** **5, 5, 9**
1, 3, 15 **1, 9, 9** **3, 5, 11** **5, 7, 7**
1, 5, 13 **3, 7, 9**

Learning Objective:

- Solve mathematical problems or puzzles.
- Recognise odd and even numbers.
- Add three small numbers mentally.

Spot the shapes

1. How many triangles can you count?
(There are a lot more than 2.) You can combine pieces together to make a triangle.

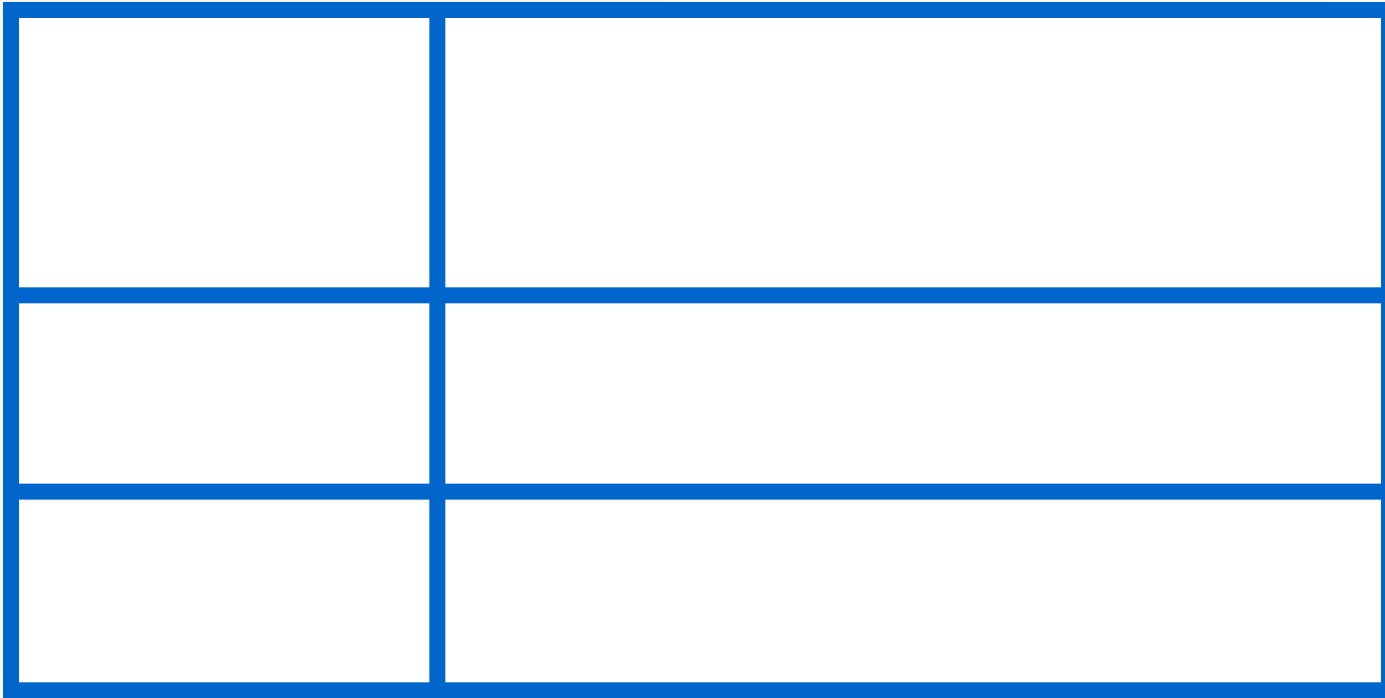


Learning Objective:

- Solve mathematical problems or puzzles.
- Visualise 2-D shapes.
- Explain methods and reasoning.

Spot the shapes

2. How many rectangles can you count?



Learning Objective:

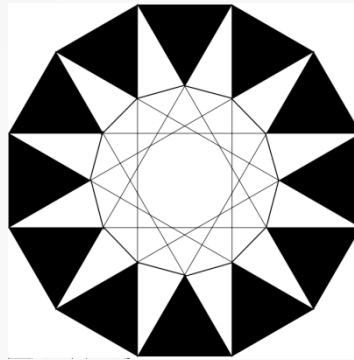
- Solve mathematical problems or puzzles.
- Visualise 2-D shapes.
- Explain methods and reasoning.

Spot the shapes

3. Draw your own diagram to count triangles.

How many can a friend find?

Can you find more?



Learning Objective:

- Solve mathematical problems or puzzles.
- Visualise 2-D shapes.
- Explain methods and reasoning.

Solution to spot the shapes

- 1. There are 9 triangles.**
- 2. There are 18 rectangles.**

Learning Objective:

- Solve mathematical problems or puzzles.
- Visualise 2-D shapes.
- Explain methods and reasoning.

Thank You

The background is a gradient of blue, transitioning from a darker blue on the left to a lighter, cyan blue on the right. At the bottom, there are several overlapping, wavy bands of color: a dark blue band, a light blue band, a yellow band, and a white band, all curving across the width of the image.

References and additional resources.

These units were organised using advice given at:

http://www.edu.dudley.gov.uk/numeracy/problem_solving/Challenges%20and%20Blocks.doc

PowerPoint template published by www.ksosoft.com

These Mental Maths challenges can be found as a PDF file at :

http://www.edu.dudley.gov.uk/numeracy/problem_solving/Mathematical%20Challenges%20Book.pdf

The questions from this PowerPoint came from:

Mathematical challenges for able pupils in Key Stages 1 and 2

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