



MATHEMATICS



N.S. Yr. 6 P.27

**Solve problems concerning
ratio and proportion**

Equipment

Paper, pencil, squared paper.

MathSphere

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Concepts

Children should be familiar with the following vocabulary:

To every, for every, in every, as many as, proportion.

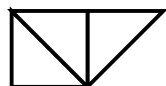
Children should understand that a phrase such as 'four to every five' compares one part with another part (eg four girls to every five boys) and that four in every seven compares a part to the whole. This use of language is very subtle and needs emphasising often.

Children should be able to spot these phrases in many situations including graphics and word problems.

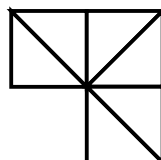
They should also be able to represent ratios as fractions and appreciate that, for example, $\frac{3}{4}$ means three-quarters of the whole. An understanding of equivalent is highly desirable here as it is important to see that $\frac{8}{10}$, for example, is the same as $\frac{4}{5}$.

Lastly, they should be able to see when one shape is a simple fraction of another.

E.g.



is one half of

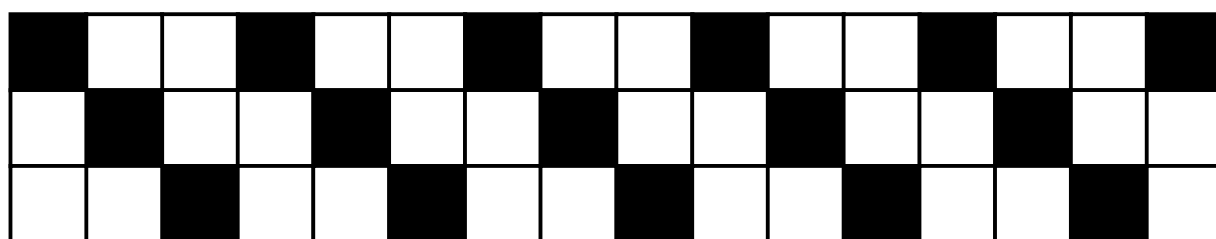


1. Here is a pattern of squares.



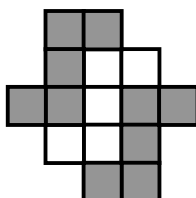
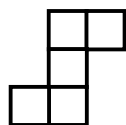
- How many black tiles to white tiles are there?
- What is the proportion of black tiles in the strip?
- What is the proportion of white tiles in the strip?

2. Here is a pattern of squares.



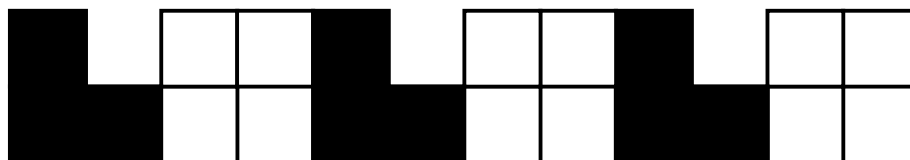
- How many black tiles to white tiles are there?
- What is the proportion of black tiles in the strip?
- What is the proportion of white tiles in the strip?

3. Here are two shapes:



How many times bigger is the larger shape than the smaller shape?
 What fraction of **the two shapes together** is the smaller shape?

1. Here is pattern of squares.



How many black and how many white squares are there?

What is the proportion of white squares in the whole pattern?

2. Here is a pattern of circles.



Complete these sentences:

For every black circle there are _____ white circles.

The proportion of black circles in the whole pattern is _____.

The proportion of white circles in the whole pattern is _____.

The number of white circles is _____ the number of black circles.

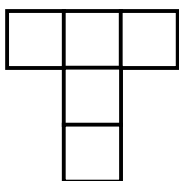
The number of black circles is _____ the number of white circles.

3. Here is a pattern of triangles.

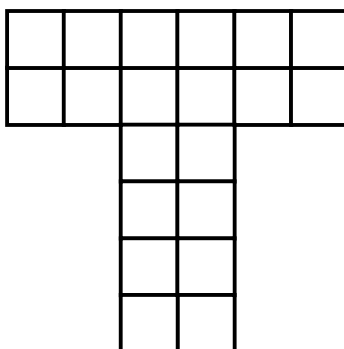


What is the proportion of white triangles to black triangles?

1.



Shape A



Shape B

Don't forget to count the squares to help you with this one.

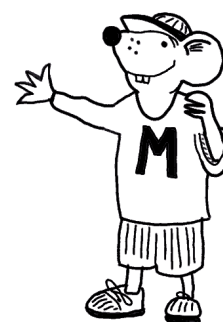
How many times is Shape B bigger than Shape A ?

How many squares are there in Shape B for each square in Shape A ?

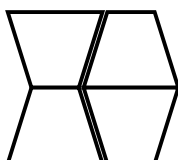
Imagine the two shapes put together.

What proportion of the new shape is Shape A ?

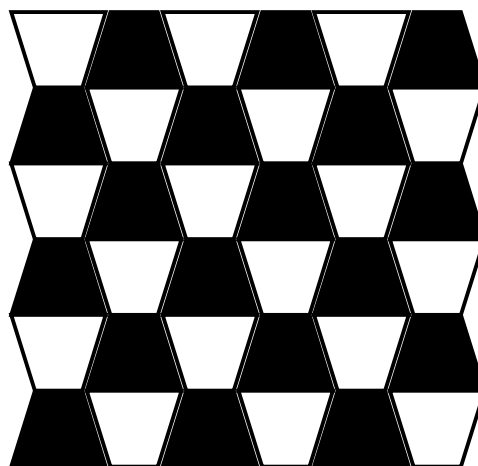
What proportion of the new shape is Shape B ?



2.



Shape A



Shape B

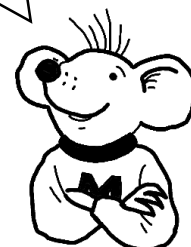
How many times is Shape A smaller than Shape B ?

How many trapeziums are there in Shape B for each trapezium in Shape A ?

What proportion of trapeziums in Shape B are black?

What proportion are white?

Try answering these word problems.



1. Jane has 15 pencils. She has three blue ones for every two red ones. How many red ones does she have?
2. A builder mixes one part of cement with four parts of sand to make mortar. If he mixes up 100 kg altogether, how much is cement?
How much is sand?
3. In a box of sweets, there are 3 boiled sweets to every 2 mints. If there are 25 sweets in the box altogether, how many of them are boiled sweets and how many are mints?
4. In painting a house, John uses twice as much undercoat as he does gloss. If he uses 60 litres of paint altogether, how much undercoat and how much gloss does he use?
What proportion of undercoat does he use?
5. One carpet covers 12 m^2 . Another covers 48 m^2 .
What proportion of both carpets does the smaller carpet cover?
What proportion does the larger carpet cover?
6. A small bookshelf holds 120 books and a large bookshelf holds 360 books.
What proportion of all the books does the smaller shelf hold?
What proportion of all the books does the larger shelf hold?
7. Two CD racks hold 280 CDs altogether. One holds three CDs for every four the other holds.
How many CDs does each rack hold?
8. John and Ken use the telephone a lot. John makes 4 calls for every 6 that Ken makes. They make 260 calls altogether.
How many calls do John and Ken make each?
What proportion of all the calls does Ken make?

Here are some shape patterns. Copy them onto squared paper and then colour them according to the rule underneath.

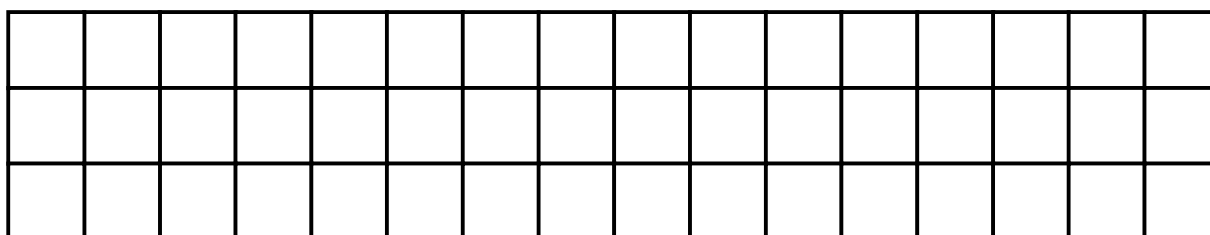
The first one has been done for you.

1.



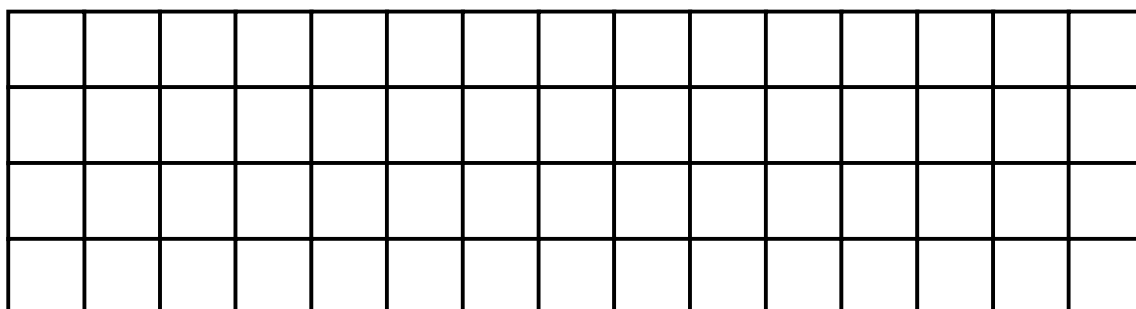
Colour one black square for every two white squares.

2.



Colour two red squares for every one green square.

3.



Colour one blue square for every three red squares.

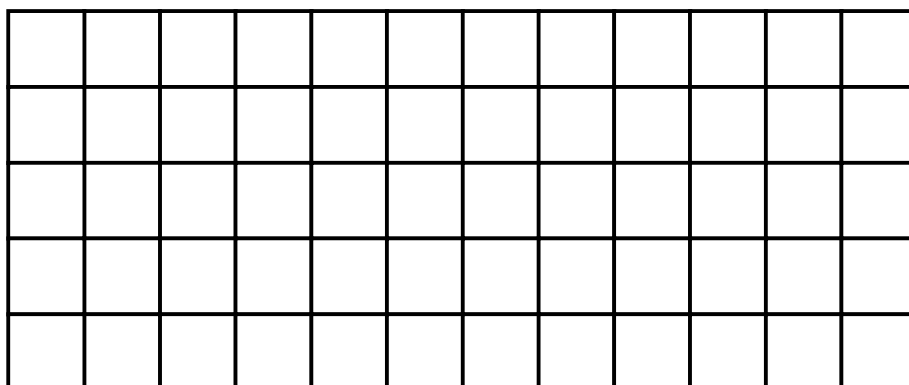
Here are some shape patterns. Copy them onto squared paper and then colour them according to the rule underneath.

1.



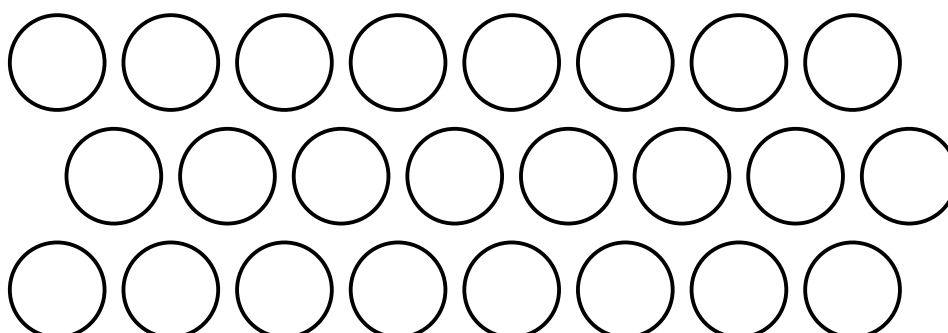
Colour two blue squares for every five green squares.

2.



Colour five orange squares for every seven purple squares.

3.



Colour two red circles to every four green circles.

Answers**Page 3**

1. a. One to every three. b. $\frac{1}{4}$ c. $\frac{3}{4}$
2. a. One to every two. b. $\frac{1}{3}$ c. $\frac{2}{3}$
3. Three times bigger. $\frac{1}{4}$

Page 4

1. 9 black, 9 white. $\frac{1}{2}$
2. For every black circle there are **two** white circles.
The proportion of black circles in the whole pattern is $\frac{1}{3}$
The proportion of white circles in the whole pattern is $\frac{2}{3}$
The number of white circles is **twice** the number of black circles.
The number of black circles is **half** the number of white circles.
3. 6 to 10 or 3 to 5

Page 5

1. 4. 4. $\frac{1}{5}$ $\frac{4}{5}$
2. 9. 9. $\frac{1}{2}$ $\frac{1}{2}$

Page 6

1. 6 red 2. 20 kg cement. 80 kg sand. 3. 15 boiled 10 mints
4. 40 litres undercoat, 20 litres gloss. $\frac{2}{3}$ 5. $\frac{1}{5}$ $\frac{4}{5}$
6. $\frac{1}{4}$ $\frac{3}{4}$ 7. 120 and 160
8. John makes 104 Ken makes 156. $\frac{6}{10}$ or $\frac{3}{5}$

Pages 7 and 8

Any patterns that conform to the rules are acceptable.