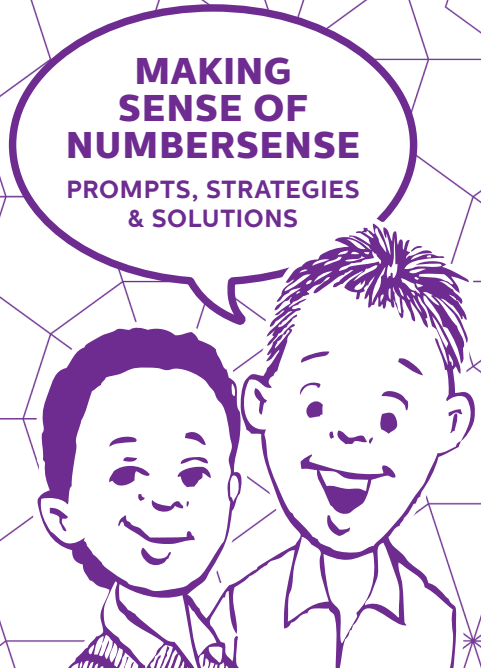
23 NumberSense

COMPREHENSIVE WORKBOOK

English

Teacher Guide



1. Place the following numbers on the number line.

a. 1,02
b. 1,06
c. 1,08
d. 1,09
e. 1,03
f. 1,07

2. Write the names of the athletes in order from first place to eighth place in the 100 m race.

Name	Time (seconds)	Name	Time (seconds)
Ben	11,9 s	John	11,59 s
Vusi	11,63 s	Bulelani	11,23 s
Selwyn	11,4 s	Robbie	11,32 s
Rashid	11,6 s	Anwar	11,3 s

I think of 11,4 as 11,40 and 11,6 as 11,60 to make comparison with the other times easier.

1. 11,23 2. 11,3 3. 11,32 4. 11,4

5. 11,59 6. 11,6 7. 11,63 8. 11,9

Explain the link in these questions?

3. Complete.

a. 0,25 ; 0,5 ; 0,75 ; 1 ; 1,25 ; 1,5 ; 1,75 ; 2
b. 0,2 ; 0,4 ; 0,6 ; 0,8 ; 1 ; 1,2 ; 1,4 ; 1,6
c. 0,3 ; 0,6 ; 0,9 ; 1,2 ; 1,5

4. a. How many 0,25s are there in 1,5? 6
b. How many 0,25s are there in 2? 8
c. How many 0,25s are there in 5? 17

5. Complete.

a. 2 ÷ 0,25 = 8
3 ÷ 0,25 = 12
2 ÷ 0,2 = 4

b. 1,5 ÷ 0,3 = 5
3 ÷ 0,3 = 10
2,1 ÷ 0,3 = 7

Notes

Ideas for teaching

Question 4

Explain how you calculated how many 0,25s there are in 1,5.

I used the number pattern in question 3 to help me.
0,25 ; 0,5 ; 0,75 ; 1 ; 1,25 ; 1,5 ; 1,75 ; 2 ... there are six 0,25s in 1,5.

I saw the number pattern, and thought about how many 25s there are in 150. There are six.

I thought about how many 25-hundredths there are in 1 and a-half.

Four 25-hundredths in 1 whole
\+ Two 25-hundredths in 1-half

Six 25-hundredths in 1 and a half

Question 5

Scaffolding ideas

- Using what they have already done on the page to help them. Questions 3 and 4 could be used for this.

Have you done something on the page that can help you with 2 ÷ 0,25?

Yes, question 3 (and 4) I can see that there are eight 0,25s in 2 wholes.
0,25 ; 0,5 ; 0,75 ; 1 ; 1,25 ; 1,5 ; 1,75 ; 2 ... I can write that as 2÷0,25=8. I can use a counting strategy to help me.

- Creating a context to help them make sense of what the calculation means.

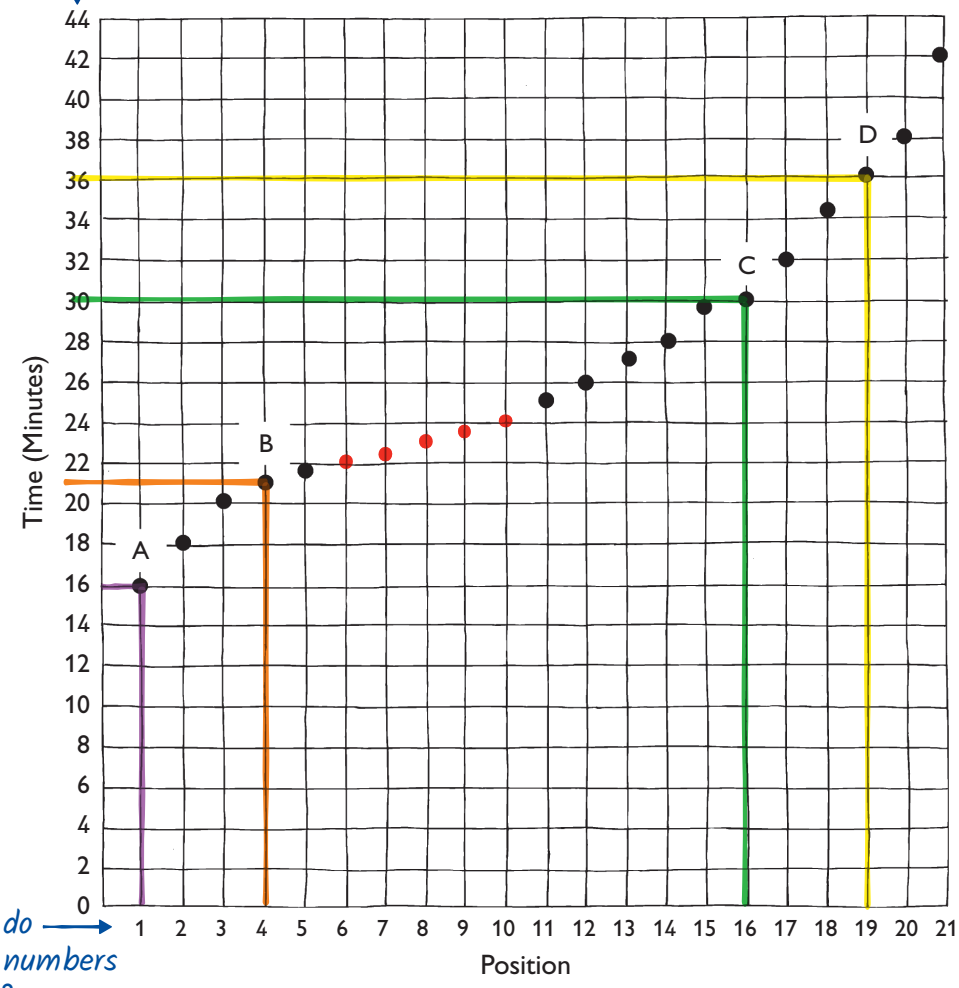
What does 3÷0,25 mean? And how does that help you with calculating it?

I have 3 wholes. How many quarters would I have in total if I cut the 3 wholes up into quarters? Can you draw a picture to show me?

Start by orientating the children. Do they know what the 2 axes represent? Do they understand the context?

What do these numbers mean?

The results of the 5 km cross country race for Ms Adam's class are summarised in the table and graph. Both the table and the graph are missing information.



Name	Pos	Time (min)
Adam	6	22
Andile	8	23
Ann	9	23,5
Bernard	14	28
Bongani C	15	29,5
Busi D	16	30
Conrad	19	36
Dean	13	27
Dudu	10	24
Fikile	18	34,5
Jabulani B	4	21
Kholeka	5	21,5
Khulani	11	25
Lindiwe	7	22,5
Leon	12	26
Mandisa A	1	16
Nombeko	3	20
Thandi	17	32
Stacy	20	38
Steven	21	42
Vernon	2	18

What do these numbers mean?

1. Use the graph to complete the table and use the table to complete the graph.

2. Who is represented by:

   A? *Mandisa* B? *Jabulani* C? *Busi* D? *Conrad*

3. How many people finished the race in:

   a. 20 min or less? *3*

   b. 30 min or less but more than 20 min? *12*

   c. 40 min or less but more than 30 min? *5*

   d. More than 40 min? *1*

How did you calculate this?

4. Calculate the pace in minutes per kilometre for:

   Busi: $30 \div 5 = 6$ min/km

   Lindiwe: $22\frac{1}{2} \div 5 = 4\frac{1}{2}$ min/km

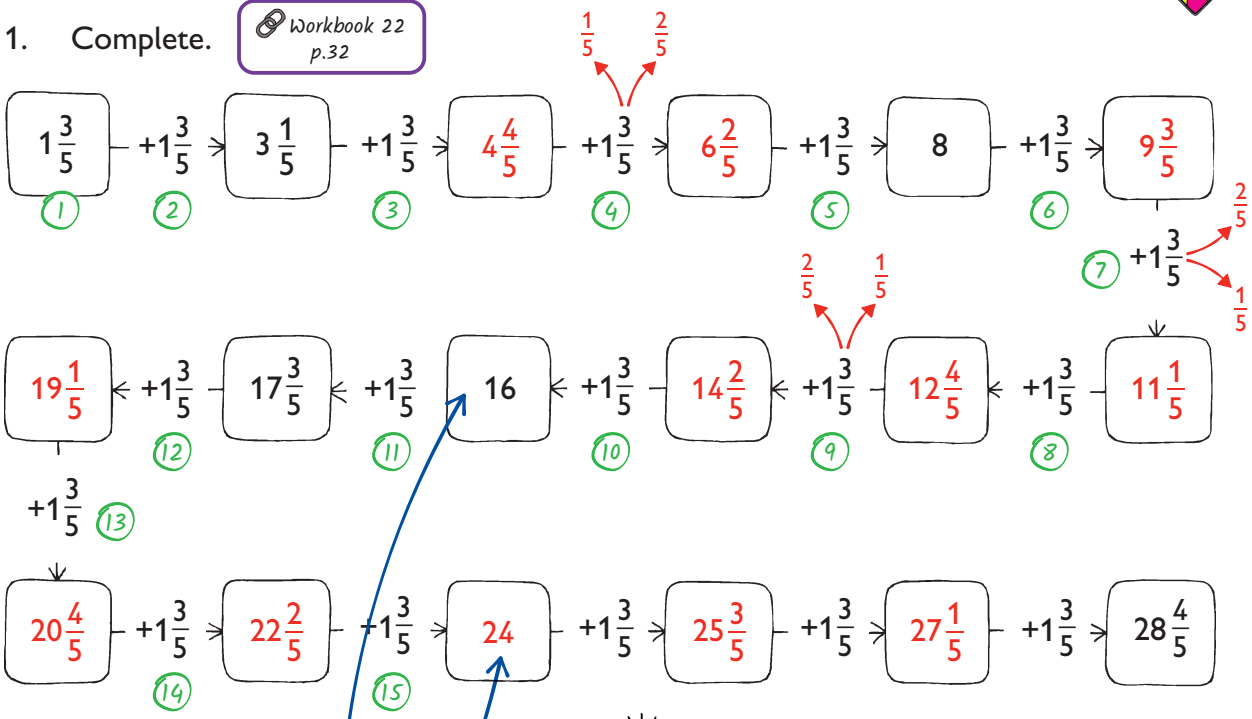
   Nombeko: $20 \div 5 = 4$ min/km

Why are you dividing by 5?

Notes

1. Complete.

Workbook 22 p.32



a. How many $1\frac{3}{5}$ m are there in 24 m?

I used the number chain to count up to 24. There are $15\frac{1}{5}$s in 24m.

b. What is:

- $1\frac{3}{5} \times 10?$ = 16
- $1\frac{3}{5} \times 15?$ = 24
- $1\frac{3}{5} \times 17?$ = $27\frac{1}{5}$
- $1\frac{3}{5} \times 30?$

I used the number chain.

30 is double 15 and I know that $1\frac{3}{5} \times 15 = 24$. So $1\frac{3}{5} \times 30$ must equal 48.

2. The length of one cement slab is $1\frac{3}{5}$ m. How many whole slabs are there in a footpath that is 48 m long?

What is the same and what is different here?

3. Calculate. *Which strategy did you use here?*

a. $2\frac{3}{8} - 1\frac{5}{8}$

b. $6\frac{1}{2} - \frac{3}{4}$

c. $3\frac{2}{5} - 1\frac{4}{5}$

d. $5\frac{1}{2} - \frac{5}{8}$

e. $1\frac{1}{4} - \frac{3}{8}$

Did you use the same strategy for a – e or did you select a strategy that suits each individual calculation?

Additional prompts and strategies

Notes

Question 3

Up to now, children have been introduced to a variety of strategies for subtracting mixed numbers and fractions. Referencing these pages will support learners in becoming more efficient and strategic when performing calculations.

- Workbook 22 p. 28 – subtracting the parts
- Workbook 22 p. 30 – change to the same fraction
- Workbook 22 p. 35 – mixed strategies

Did you use any of the strategies we discussed in Workbook 22? Explain why, or why you didn't use them.

Workbook 14 p.28
Workbook 18 p.3

Continues on p.15

1. Grace makes pictures with dots like this. The first 3 pictures make a pattern.

How did you draw pictures 4, 5 and 6?

Picture 1 Picture 2 Picture 3 Picture 4 Picture 5 Picture 6

a. Draw the fourth, fifth and sixth pictures in the pattern.

b. Complete the table.

Picture number	1	2	3	4	5	6	7	10	12
Total number of dots	1	3	6	10	15	21	28	55	78

+2 +3 +4 +5 +6 +7 +8 +9 +10 +3 +2 +11 +12

c. Describe, in words, how you completed the table.

I added one more than I added the previous time.

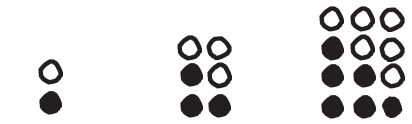
I added consecutive numbers, starting at 2.

d. How many dots will there be in picture 15?

$78 + 13 + 14 + 15 = 78 + 42 = 120$

2. Lutho makes pictures with dots like this. The first 3 pictures make a pattern.

How did you draw pictures 4, 5 and 6?



Picture 1 Picture 2 Picture 3 Picture 4 Picture 5 Picture 6

a. Draw the fourth, fifth and sixth pictures in the pattern.

b. Complete the table. *What patterns do you see in the table and the picture?*

Picture number	1	2	3	4	5	6	7	10	12
Total number of dots	2	6	12	20	30	42	56	110	156

+4 +6 +8 +10 +12 +14

78 × 2

55 × 2

Graces pattern: 28 doubled ⇒ 56

c. Describe, in words, how you completed the table.

I added even numbers starting at 4.

I doubled Grace's table values.

d. How many dots will there be altogether in picture 15?

What is the same with Grace and Lutho's patterns?

What is different?

I noticed that Lutho's pattern is double Grace's pattern. I can see it in the picture and I can see it in the table.

Continued from p.14

Sally and Abdul are calculating the number of dots needed for each picture in Lutho's pattern.

Sally

I notice that the dots make a rectangle. One side has the same number of dots as the picture number. The other side has one more dot. I write:
picture 2: no. of dots = 2 × 3 = 6
picture 3: no. of dots = 3 × 4 = 12

? Use the pictures to show/explain Sally's way.

? Use the pictures to show/explain Abdul's way.

I see that each rectangle of dots consists of a row of dots and a square of dots.
picture 2: no. of dots = 2 + 2 × 2 = 6
picture 3: no. of dots = 3 + 3 × 3 = 12

Abdul

3. Complete.

	Sally	Abdul
Picture 1	___ × ___ = ___	___ + ___ × ___ = ___
Picture 2	2 × 3 = 6	2 + 2 × 2 = 6
Picture 3	3 × 4 = 12	3 + 3 × 3 = 12
Picture 4	___ × ___ = ___	___ + ___ × ___ = ___
Picture 5	___ × ___ = ___	___ + ___ × ___ = ___
Picture 10	___ × ___ = ___	___ + ___ × ___ = ___
Picture 15	___ × ___ = ___	___ + ___ × ___ = ___
Picture 20	___ × ___ = ___	___ + ___ × ___ = ___

? Explain how you completed these.

Here is the same issue again. It is possible to interpret Abdul's expression in different ways, but only one way gives the answer that Abdul wants!

4. What does Abdul do when he calculates 3 + 3 × 3 to get the answer of 12?

Order of operations.

Workbook 22 p.25

5. Use Sally and Abdul's thinking to see if you can work out a rule for calculating the number of dots needed for each picture in Grace's pattern.

? Explain how you worked out your rule.

Sally

$\frac{1}{2}$ of pic number × (picture number + 1)

Abdul

$\frac{1}{2}$ of (pic number × picture number plus picture number)

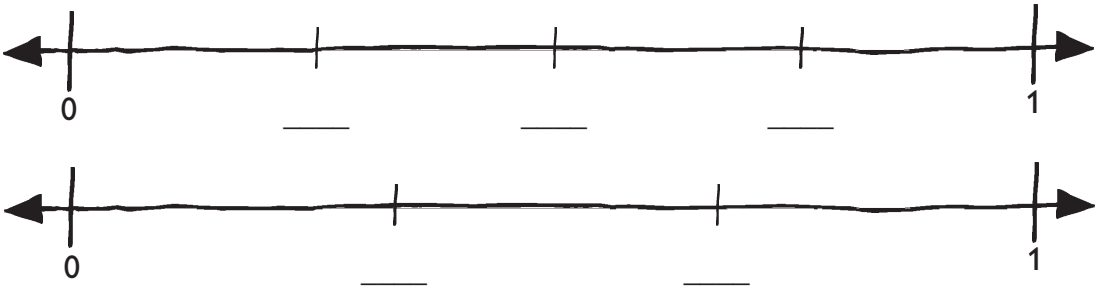
Explain how you placed the numbers on the number line?

1. Place these numbers on the number line as carefully as you can.

$3\frac{4}{5}$; $4\frac{2}{3}$; $3\frac{3}{16}$; $3\frac{5}{9}$; $4\frac{2}{5}$

I begin by estimating where 4 will be; and then one-half and then go from there.

2. Complete.



3. Use the number lines to help you decide which is bigger:

a. $\frac{1}{3}$ or $\frac{1}{4}$? _____ Explain.

b. $\frac{2}{3}$ or $\frac{3}{4}$? _____ Explain.

4. Calculate.

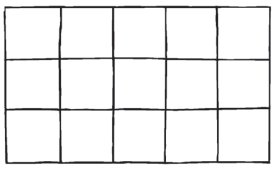
a. $\frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5}$

b. $\frac{6}{7} + \frac{6}{7}$

c. $\frac{1}{9} + \frac{1}{9} + \frac{1}{9} + \frac{1}{9}$

5. Colour in $\frac{2}{3}$ of each of these grids.

a.



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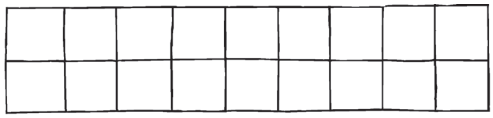
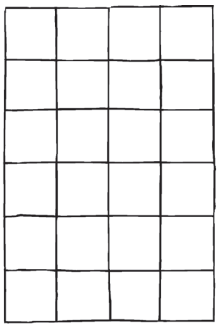
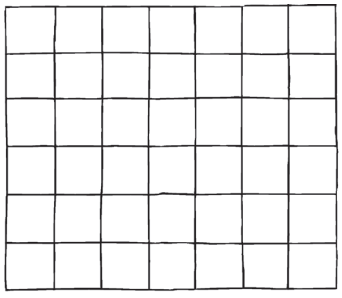


c.



d.



Notes

Additional prompts and strategies

Question 5

Children may colour any blocks, just ensure 2-thirds are shaded. Make sure that the children can explain their thinking.

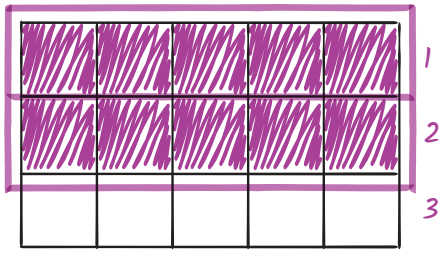
a) 2-thirds of 15 = 10 blocks

b) 2-thirds of 18 = 12 blocks

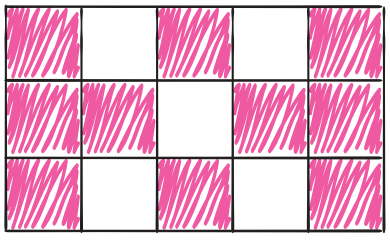
c) 2-thirds of 24 = 16 blocks

d) 2-thirds of 42 = 28 blocks

? Explain how you shaded 2-thirds of the grid.



I saw the thirds in the horizontal rows.



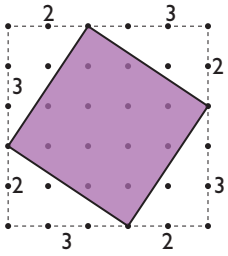
I know $\frac{2}{3}$ of 15 = 10 blocks
I coloured in 10 blocks.

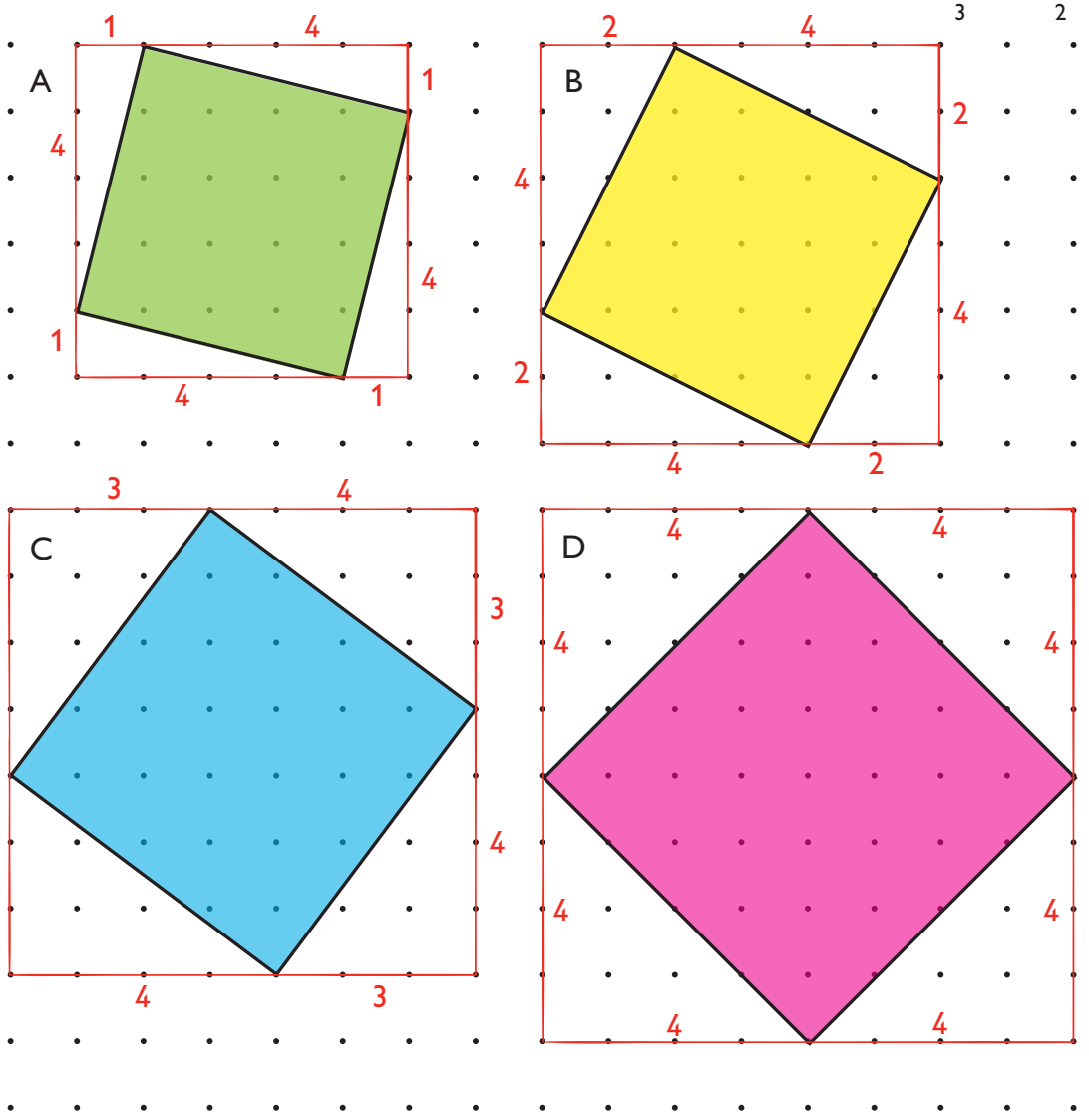
First introduction to parallel lines.

Parallel lines are lines that are always the same distance apart and never meet.

The opposite sides of a square are parallel to each other.

1. Using the dots of the grid, draw a larger square around each square. For each of the triangles that have been created, add the lengths of the two sides to the drawing. An example has been done for you.





2. Describe what you notice about the triangles on the opposite sides of the squares.

The triangles on opposite sides are the same. They are reflected/rotated.

All the triangles are the same size, they are in different orientations/positions.

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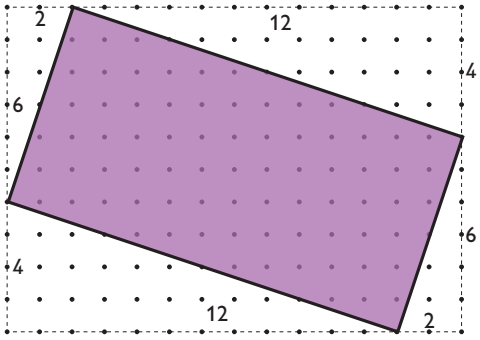
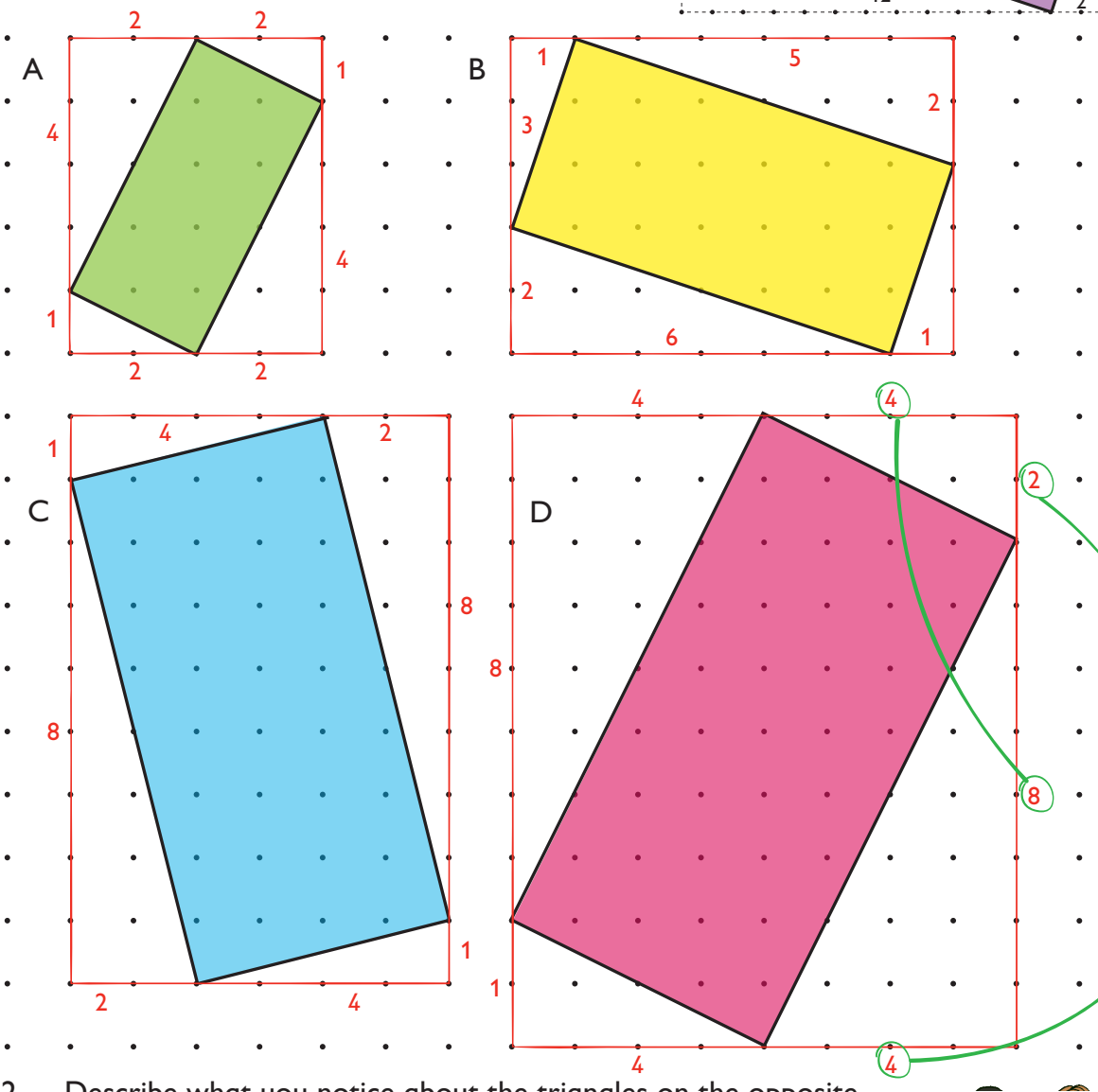
The opposite sides of a rectangle are parallel to each other.

1. Use the dots of the grid to draw a larger rectangle around each rectangle. For each of the triangles that have been created, add their lengths to your drawing. An example has been done for you.





2. Describe what you notice about the triangles on the opposite sides of the rectangles.
   - They are the same size.
   - Different orientations/positions.

3. How is what you noticed with the rectangles the same and different to what you noticed with the squares on page 41?

Squares → all the triangles are the same.
Rectangles → only the opposite pairs are the same size.

I notice that the sides of the larger set of triangles are double the length of the sides of the smaller set of triangles.

Practical activity

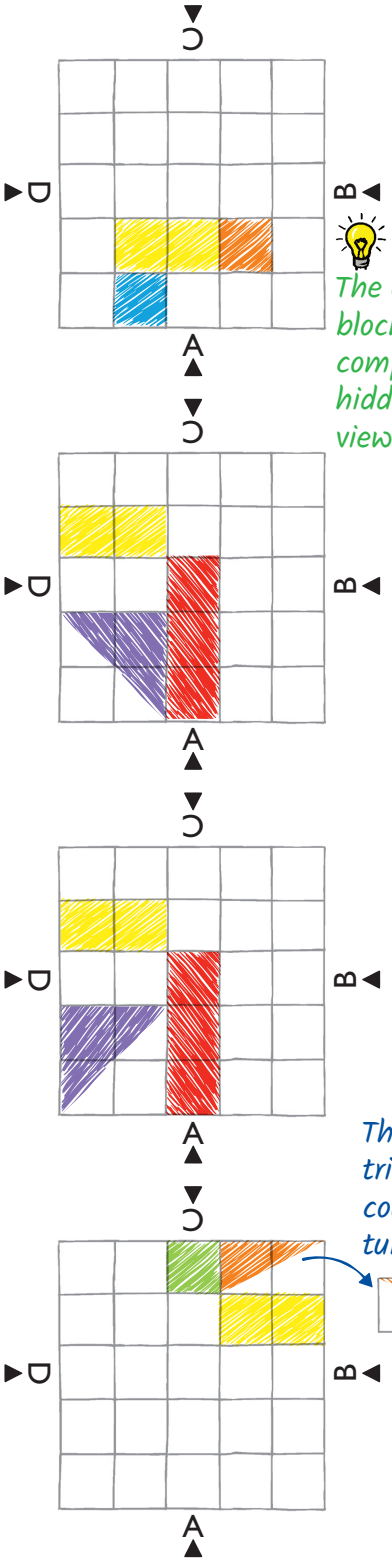
GEOGENIUS VISUALISATION KIT

Use the GeoGenius Visualisation Kit to complete this task. You should work in a group of four.

1. Use set 6 of the novice cards.
   a. Arrange the blocks on the grid as illustrated on the cards. Start with view B.
   b. Explain why none of the four views are the same. *Some blocks are behind others and you can only see part of them.*
   c. Draw a sketch of the top view of the final arrangement of the blocks on the grid.

2. Use set 8 of the novice cards.
   a. Arrange the blocks on the grid as illustrated on the cards. Start with view A.
   b. How many different correct solutions are there? 2
      Draw a sketch of the top view of at least two different possible arrangements of the blocks.
   c. In completing the arrangement of the blocks, you knew to use the large triangular block because of the colours used on the cards. If there were no colours to guide you, how would you have known to use the large triangular block? Could you have used a different block? Could also use the purple block.

3. Use set 9 of the novice cards. Start with view D.
   a. Arrange the blocks on the grid as illustrated on the cards.
   b. How many different solutions are there? 2
      Draw a sketch of the top view of at least two different possible arrangements of the blocks.



The orange block is completely hidden in view D.

The triangle could be turned.

4. Describe the similarities and differences between the views of the two triangular blocks that you used in these questions. Use sketches to support your thinking.
   Blue triangular block looks like a square from certain views.
   Orange block looks like a rectangle or a square, depending on how it is placed.