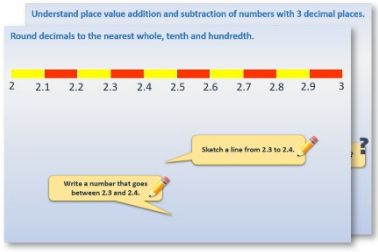
Year 6: Week 3, Day 2
Scale factor problems

Each day covers one maths topic. It should take you about 1 hour or just a little more.

1. Start by carefully reading through the **Learning Reminders**.



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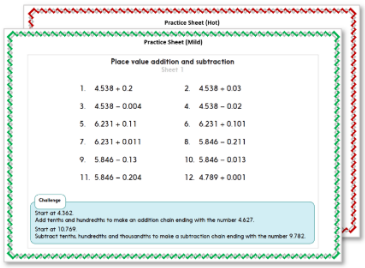
2. Tackle the questions on the **Practice Sheet**.
   There might be a choice of either Mild (easier) or Hot (harder)!
   Check the answers.



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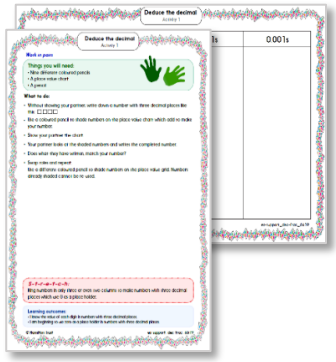
3. Finding it tricky? That's OK… have a go with a grown-up at **A Bit Stuck?**



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4. Think you've cracked it? Whizzed through the Practice Sheets? Have a go at the **Investigation**…

Learning Reminders

Solve problems involving scale factors.

Accurately sketch a rectangle with sides of lengths 4cm and 7cm.

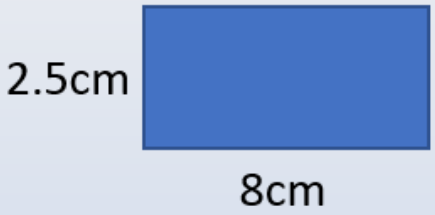
If we **double** the lengths of the sides of this rectangle, what will its new dimensions be?

We **multiplied** both the length and the width **by 2.**
We say that we have **enlarged** the rectangle by a **scale factor** of **2.**

Learning Reminders

Solve problems involving scale factors.

If we **enlarge** the smaller rectangle by a **scale factor** of **4**, what will be its new dimensions?



See answer below

Answer

10cm by 32cm

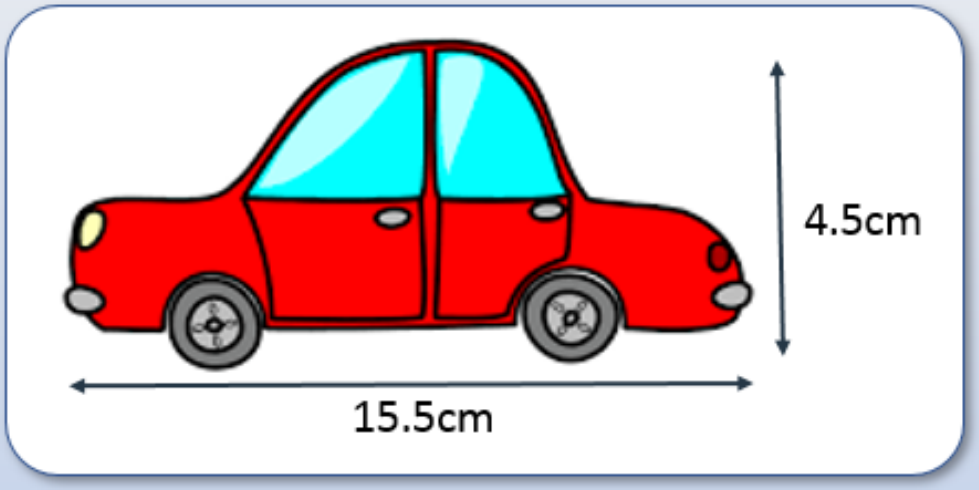
Learning Reminders

Solve problems involving scale factors.

This toy has been *sketched* with the dimensions shown.

In real life, it is **enlarged** by a **scale factor** of **x5**.

What are its *actual* width and height?



See answer below

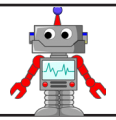
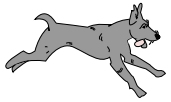
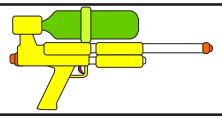
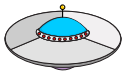
Answer

77.5cm by 22.5cm

Practice Sheet Mild

Toy designs

A toy designer has drawn sketches to scale. Use the scale factor to calculate the length and height of the actual toy or drawing.

Toy	Drawn width and height	Scale factor	Actual width and height
	7cm by 4.5cm	× 4	
	5cm by 8cm	× 3	
	16cm by 24cm	× 1.5	
	10cm by 6cm	× 2.5	
		× 2	32cm by 12cm
		× 4	18cm by 24cm

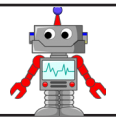
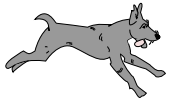
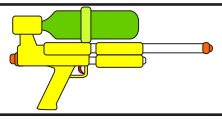
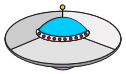
Challenge

An ant measures 8mm by 6mm. Work out a scale factor so that a drawing of it would almost fill a page in your book!

Practice Sheet Hot

Toy designs

A toy designer has drawn sketches to scale. Use the scale factor to calculate the length and height of the actual toy or drawing.

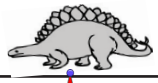
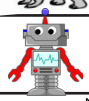
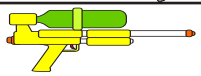
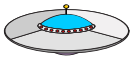
Toy	Drawn width and height	Scale factor	Actual width and height
	13cm by 4.5cm	× 4	
	5cm by 8cm	× 2.5	
	15cm by 23cm	× 1.5	
	12cm by 7cm	× 3.5	
		× 5	95cm by 13.5cm
		× 20	110cm by 25cm

Challenge

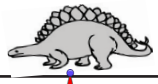
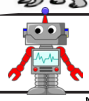
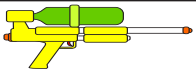
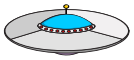
An ant measures 8mm by 6mm. Work out a scale factor so that a drawing of it would almost fill a page in your book!

Practice Sheets Answers

Toy designs (mild)

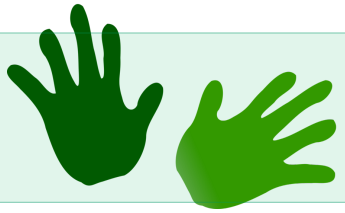
Toy	Drawn width and height	Scale factor	Actual width and height
	7cm by 4.5cm	× 4	28cm by 18cm
	5cm by 8cm	× 3	15cm by 24cm
	16cm by 24cm	× 1.5	24cm by 36cm
	10cm by 6cm	× 2.5	25cm by 15cm
	16cm by 6cm	× 2	32cm by 12cm
	4.5cm by 6cm	× 4	18cm by 24cm

Toy designs (hot)

Toy	Drawn width and height	Scale factor	Actual width and height
	13cm by 4.5cm	× 4	52cm by 18cm
	5cm by 8cm	× 2.5	12.5cm by 20cm
	15cm by 23cm	× 1.5	22.5cm by 34.5cm
	12cm by 7cm	× 3.5	42cm by 24.5cm
	19cm by 3.4cm	× 5	95cm by 13.5cm
	5.5cm by 1.25cm	× 20	110cm by 25cm

A Bit Stuck?
Factors and Multiples Game

Things you will need:
- 1-50 grids



What to do:

Print several copies of the 1-50 game grid.

1. This is a game for two players. The first player chooses an even number <30, and crosses it out on the 1-100 grid, e.g. 18.

2. The second player must then cross out a number which is a *factor or multiple* of the first number, e.g. 1, 2, 3, 6 or 9 (factors of 18), or 36 (the only multiple of 18 that is <50).

3. Players continue to take it in turns to cross out numbers, at each stage choosing a number that is a factor or multiple of the number just crossed out by the other player.

4. The first person who is unable to cross out a number loses that round.

S-t-r-e-t-c-h:

Switch the challenge from winning the game to covering as many numbers as possible.
- What is the longest sequence of numbers that can be crossed out?
- Can more than half the numbers be crossed out?

Learning outcomes:

- I can recall factors of 2-digit numbers.
- I can use mental strategies to calculate multiples of 2-digit numbers, up to 50.

A Bit Stuck?

Factors and Multiples Game

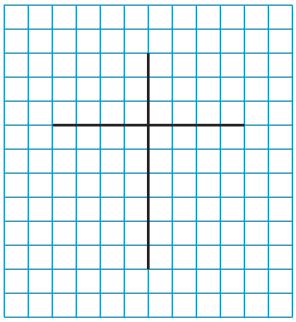
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

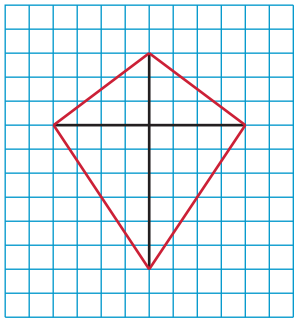
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Investigation

Geometry genius

1. Draw a vertical line 9cm long on cm² squared paper. 3cm down this line, draw a perpendicular line 8cm long so that the first line bisects the second, as below:
2. Join the ends with straight lines to form a kite.



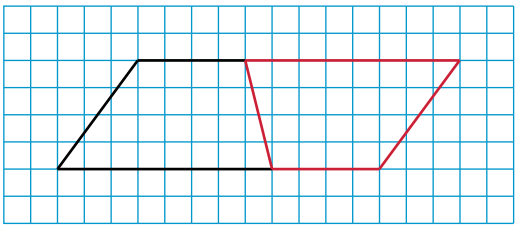


3. Use what you know about the finding the area of triangles to find the area of this kite.
4. Now draw your own kite, by first drawing the lines as above, but choosing your own whole number of centimetres for each one. Find the area of this new kite.

Can you see a relationship between the lengths of the diagonals and the area of the kite? Use this to write your own formulae for finding the area of a kite!

5. A rhombus is a special kite. All four sides are equal in length, and the diagonals are also equal in length. Draw a rhombus, beginning by drawing diagonals as above and find its area.
6. Repeat until you have enough information to write a formula for finding the area of any rhombus.

7. Draw a trapezium making sure that the pair of parallel sides are each a whole number of centimetres. Draw an identical one upside down alongside it like this:

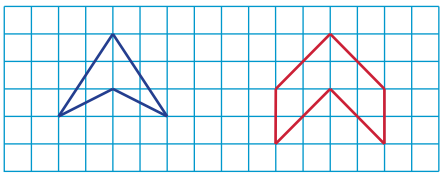


8. What is this new shape? Find the area of the new shape.
9. Use what you have found to write a formula for finding the area of trapezium.

It's amazing how much new maths you can work out now that you are in Year 6!
You are a geometry genius!

Challenge

Write a formula for finding the area of an inverted kite or a regular hexagon, or even a symmetrical but irregular one like this!



Inverted kite

Symmetrical irregular inverted hexagon

Investigation

Geometry genius