5G–2 Compare and calculate areas

Compare areas and calculate the area of rectangles (including squares) using standard units.

5G–2 Teaching guidance

Pupils need to know that the area of a shape is the space within a shape. When there is a clear visual difference, pupils should be able to compare the area of shapes without making a quantitative evaluation of each area. For example, pupils can see that the circle has a larger area than the decagon.

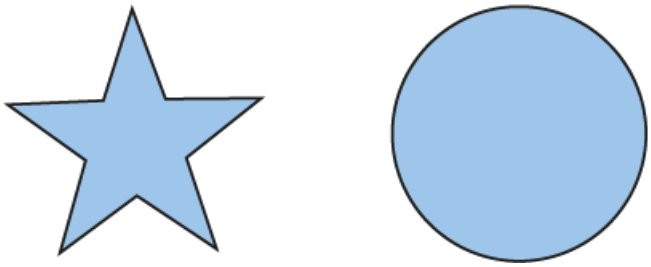


Figure 198: a decagon and a circle with a clear visual difference in area

Pupils should learn that, when there is not a clear visual difference between areas, a common unit can be used to quantify the areas and enable comparison. They should understand that any unit can be used, but that the square centimetre (cm^2) is the standard unit of measure for area that they will use most frequently. Pupils should gain a sense of the size of a square centimetre, and the notation used, before they begin to quantify other areas using this unit.

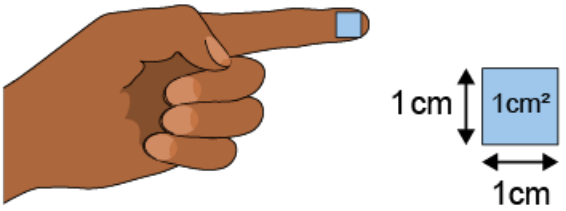


Figure 199: a square centimetre

Pupils need to be able to find the area of shapes drawn on square-centimetre grids by counting squares, including shapes for which some of the area is made up of half-squares. They should understand that different shapes can have the same area.

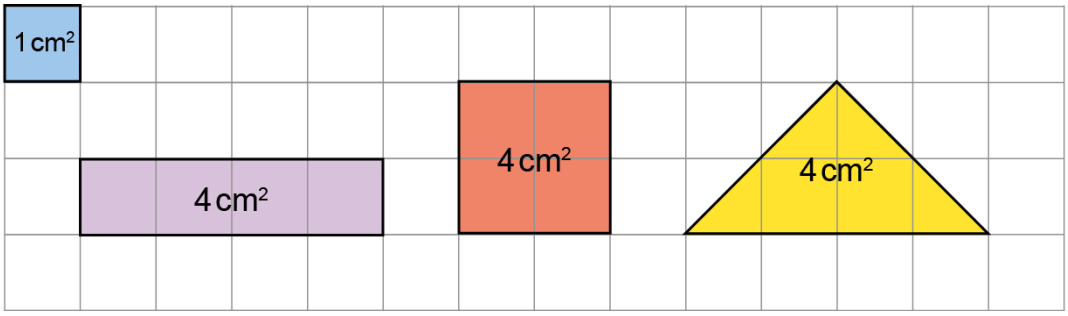


Figure 200: a rectangle, square and triangle with equal areas

Drawn to actual size.

Pupils should then learn that the area of a rectangle can be calculated by multiplying the length by the width. They should learn why this is the case by examining rectangles drawn on square-centimetre grids, and understand that the factors can be written in either order: the area of the rectangle below is equal to 4 rows of 5 square centimetres, or 5 columns of 4 square centimetres. This should build on pupils understanding of the grouping structure of multiplication and array representations.

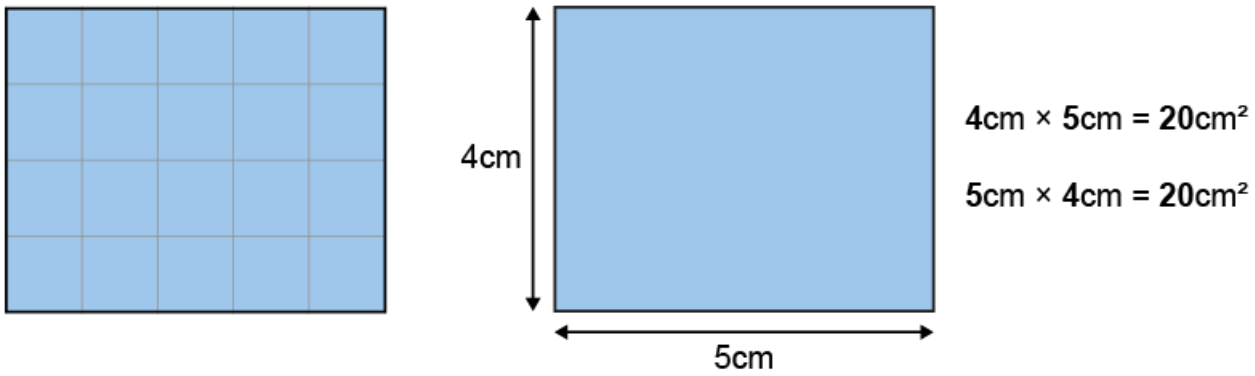


Figure 201: the area of a rectangle can be calculated by multiplying the length by the width

Drawn to actual size.

Language focus

"To find the area of a rectangle, multiply the length by the width."

Pupils should learn that the area of larger shapes and spaces, such as the floor or ceiling of the classroom, or the playground, is expressed in square metres (m^2). Pupils should experience working with large spaces directly, as well as drawings representing them.

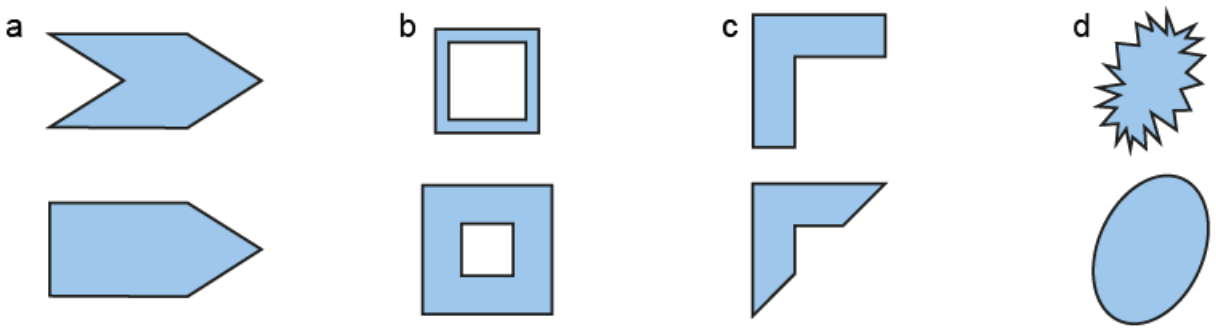
Making connections

Pupils must be able to multiply two numbers together in order to calculate the area of a rectangle, including:

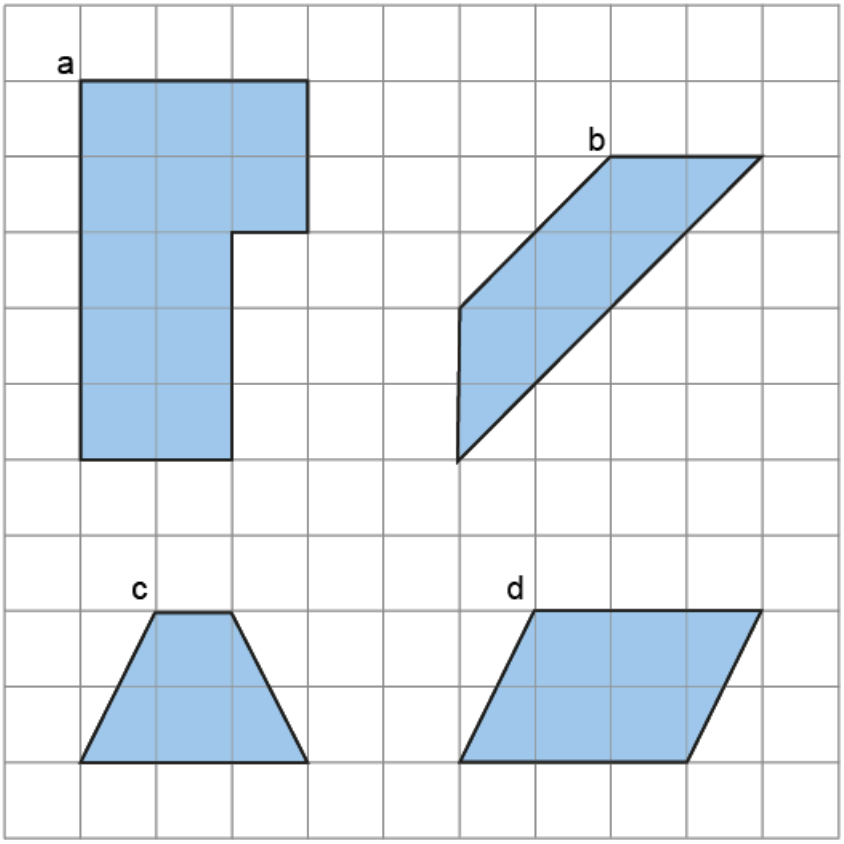
- known multiplication facts within the multiplication tables (5NF–1) (for example, to calculate the area of a 9cm by 4cm rectangle)
- scaling known multiplication facts by 10 or 100 (3NF–3 , 4NF–3 and 5NF–2) (for example, to calculate the area of a 0.2m × 3m rectangle or a 20m × 3m rectangle)
- other mental or written methods (for example, to calculate the area of a 15cm × 8cm rectangle)

5G–2 Example assessment questions

1. For each pair of shapes, tick the shape with the larger shaded area.

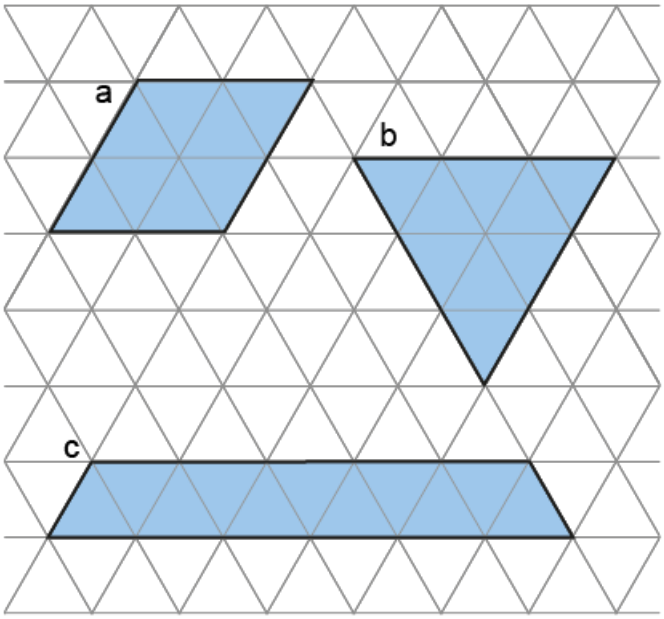


2. Find the area of these shapes drawn on a square-centimetre grid.



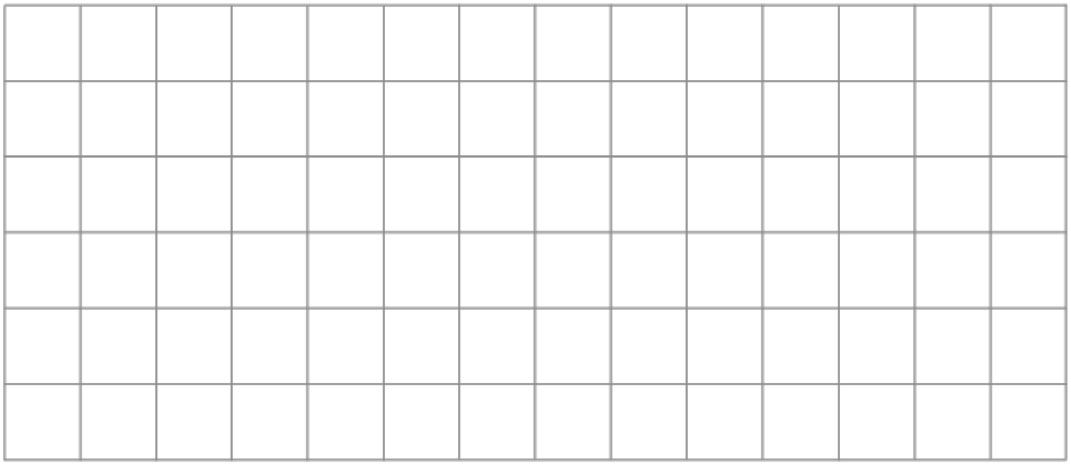
Drawn to actual size.

3. Here are three shapes on a triangular grid. Put the shapes in order from smallest to largest according to their area.



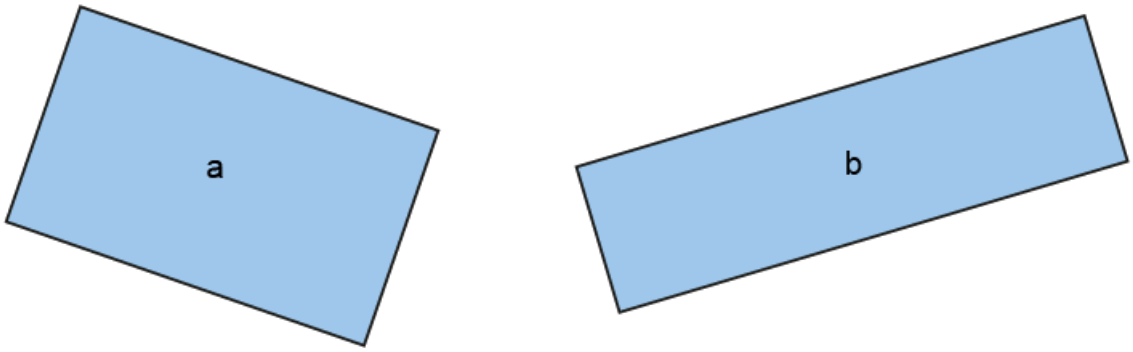
4. a. Draw a rectangle with an area of 12cm^2 on this square-centimetre grid.

   b. Draw a hexagon with an area of 12cm^2 on this square-centimetre grid.

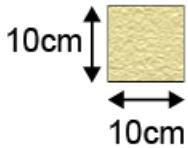


Drawn to actual size.

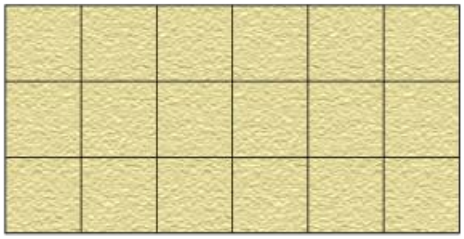
5. Find the area of each of these rectangles.



6. Leila is putting some tiles on the wall behind her kitchen sink. Each tile is square, with sides equal to 10cm.

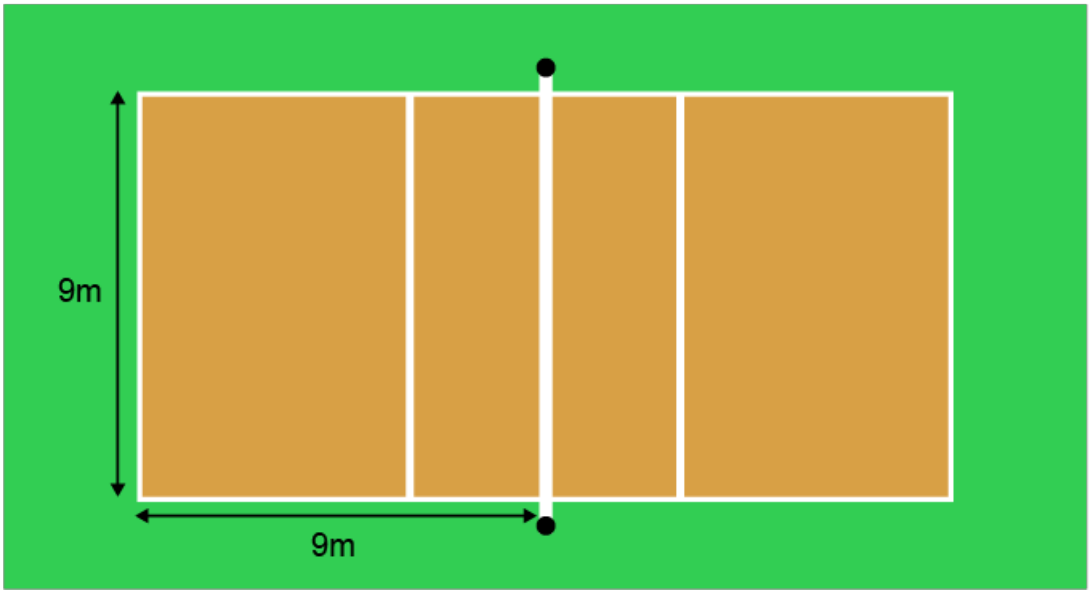


   Here is the area she has tiled so far.



   If Leila adds one more row of tiles on top of these ones, what is the total area she will have tiled?

7. Each half of a volleyball court is a $9\text{m} \times 9\text{m}$ square. What is the total area of a volleyball court?



Drawn to scale.

8. Estimate the area of your classroom floor.

Calculation and fluency

Number, place value and number facts: 5NPV–2 and 5NF–2

- **5NPV–2** Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and non-standard partitioning.

- **5NF–2** Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 1 tenth or 1 hundredth), for example:

8 + 6 = 14	3 × 4 = 12
0.8 + 0.6 = 1.4	0.3 × 4 = 1.2
0.08 + 0.06 = 0.14	0.03 × 4 = 0.12

Representations such as place-value counters and partitioning diagrams (**5NPV–2**) and tens-frames with place-value counters (**5NF–2**) can be used initially to help pupils understand calculation strategies and make connections between known facts and related calculations. However, pupils should not rely on such representations for calculating. For the calculations in **5NF–2**, for example, pupils should instead be able to calculate by verbalising the relationship.