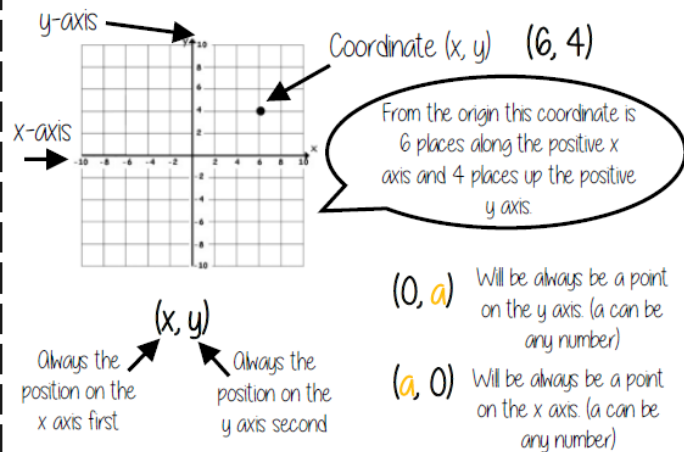


Knowledge Organiser: Year 7 Maths; Co-ordinate Geometry (Part 1)



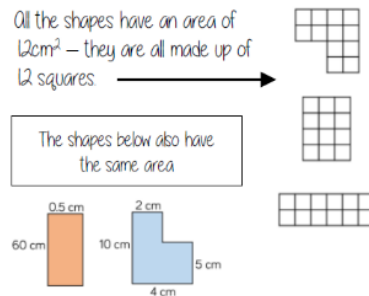
Coordinates in four quadrants



(x, y)

- The coordinates are always in **ALPHABETICAL ORDER, x then y.**
- x is always the flat axis going **ACROSS** the page. In other words '**x is a...cross**'. Get it — x is a 'x'. (Hilarious isn't it)
- Remember it's always **IN THE HOUSE** (→) and then **UP THE STAIRS** (↑) so it's **ALONG first** and **then UP**, i.e. x-coordinate first, and then y-coordinate.

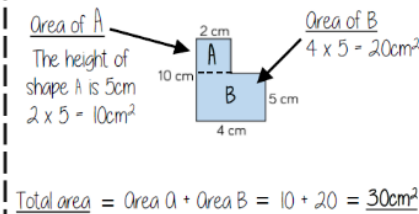
Shapes with the same area



Area

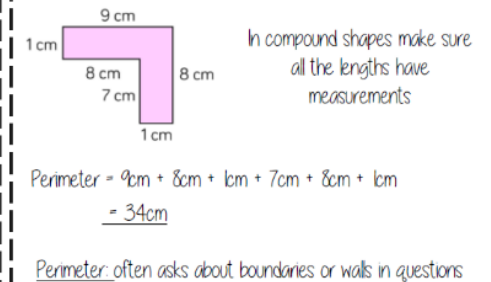
Rectangle/ Square area = Base x Height

Compound Shapes



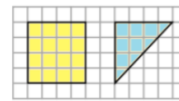
Perimeter

Length around the outside of the shape



Area of triangles

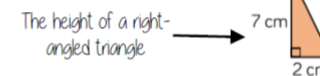
Area can be calculated by counting squares. Often this is an estimation with triangles if it does not cut a square in half.



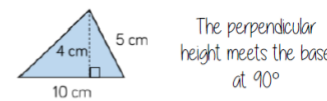
Notice the relationship between the square and the triangle.

Area triangle = $\frac{1}{2}$ area of the square.

Right-angled triangles



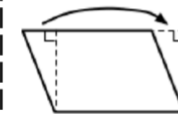
Perpendicular heights



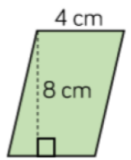
Area = $\frac{1}{2} \times 10 \times 4 = 20\text{cm}^2$

Area triangle = $\frac{1}{2} \times \text{base} \times \text{perpendicular height}$

Area of parallelograms



Parallelogram = Base x Perpendicular height



Area = $4 \times 8 = 32\text{cm}^2$

Properties of parallelograms

- Two sets of parallel lines
- Four sides (quadrilateral)
- Interior angles = 360°
- Opposite angles are equal
- 2D shape

Line; infinite in both directions

Line

Ray

Ray; infinite in one direction

Line Segment

Line segment; a line bounded by two distinct end points

We can find the length of a line segment because it has two end points. We can't measure lines and rays!

Keywords

- Quadrant: four quarters of the coordinate plane.
- Coordinate: a set of values that show an exact position
- Horizontal: a straight line from left to right (parallel to the x axis)
- Vertical: a straight line from top to bottom (parallel to the y axis)
- Origin: (0,0) on a graph. The point the two axes cross
- Area: Space inside a 2D object
- Perimeter: Length around the outside of a 2D object
- Perpendicular: At an angle of 90° to a given surface

Knowledge Organiser: Year 7 Maths; Co-ordinate Geometry (Part 2)

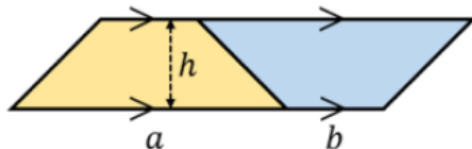


Area of a trapezium

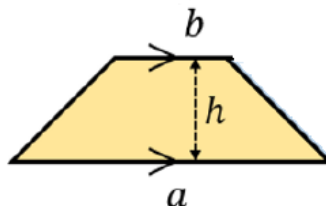
Area of a trapezium

$$\frac{(a+b) \times h}{2}$$

Why?

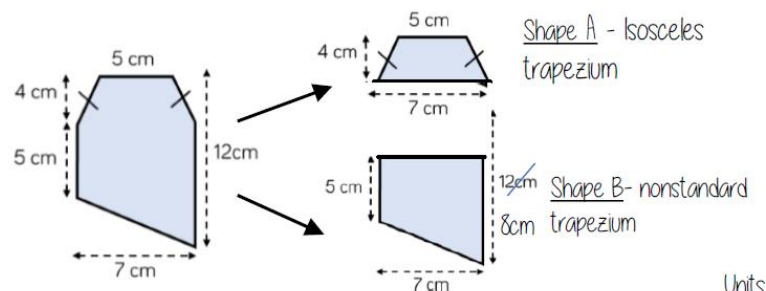


- Two congruent trapeziums make a parallelogram
- New length $(a + b) \times$ height
- Divide by 2 to find area of one



Compound shapes

To find the area compound shapes often need splitting into more manageable shapes first. Identify the shapes and missing sides etc. first.



Shape A + Shape B = total area

$$\frac{(5+7) \times 4}{2} + \frac{(5+8) \times 7}{2} = 24 + 45.5 = 69.5 \text{ cm}^2$$

Units

Square and cube numbers

Square numbers



$144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3$

$(2 \times 2 \times 3) \times (2 \times 2 \times 3)$

12×12

Prime factors can find square roots



$\sqrt{144} = 12$

Cube numbers



$1, 8, 27, 64, 125 \dots$

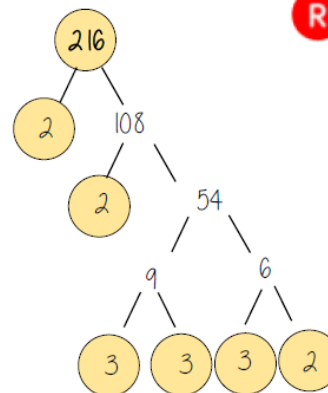
$216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$

$(2 \times 3) \times (2 \times 3) \times (2 \times 3)$

$6 \times 6 \times 6$

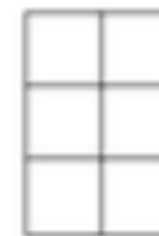


$\sqrt[3]{216} = 6$



Area – rectangles

Rectangle
 Base x Height



Squares

Make sure you know what powers are and how they work

THE SQUARES:	1 ²	2 ²	3 ²	4 ²	5 ²	6 ²	7 ²	8 ²	9 ²	10 ²	11 ²	12 ²	13 ²	14 ²	15 ²
	1	4	9	16	25	36	49	64	81	100	121	144	169	196	225
	(1x1)	(2x2)	(3x3)	(4x4)	(5x5)	(6x6)	(7x7)	(8x8)	(9x9)	(10x10)	(11x11)	(12x12)	(13x13)	(14x14)	(15x15)

Square Roots

'Squared' means 'multiplied by itself': $6^2 = 6 \times 6 = 36$

SQUARE ROOT $\sqrt{\quad}$ is the reverse process: $\sqrt{36} = 6$

The best way to think of it is: 'Square Root' means 'What Number Times by Itself gives...'





How do we use Knowledge Organisers in Mathematics?

How can you use knowledge organisers at home to help us?

- **Retrieval Practice:** Read over a section of the knowledge organiser, cover it up and then write down everything you can remember. Repeat until you remember everything.
- **Flash Cards:** Using the Knowledge Organisers to help on one side of a piece of paper write a question, on the other side write an answer. Ask someone to test you by asking a question and seeing if you know the answer.
- **Mind Maps:** Turn the information from the knowledge organiser into a mind map. Then reread the mind map and on a piece of paper half the size try and recreate the key phrases of the mind map from memory.
- **Sketch it:** Draw an image to represent each fact; this can be done in isolation or as part of the mind map/flash card.
- **Teach it:** Teach someone the information on your knowledge organiser, let them ask you questions and see if you know the answers.

How will we use knowledge organisers in Mathematics?

Knowledge organisers will be used before I complete a Learning Check or Common Assessment. I will spend part of the lesson looking over each of the key topics of the half term before completing the Learning Check or Common Assessment.

I will also use these at home to complete my own independent learning and revision of these key topics.

GLUE HERE