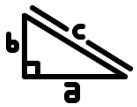
Maths	Geometry / Ratio & Proportion	Year 9	Term 5

Week 1: Pythagoras' Theorem

Pythagoras' Theorem

$$a^2 + b^2 = c^2$$

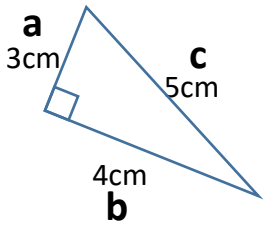


In any right angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

hypotenuse The **longest side** in a right-angled triangle. Represented by 'c'.

The hypotenuse can always be found **opposite the right angle**.

Worked example:



$a^2 + b^2 = c^2$
$3^2 + 4^2 = 5^2$
$9 + 16 = 25$

4 Times Tables

1 x 4 = 4	4 x 4 = 16	7 x 4 = 28	10 x 4 = 40
2 x 4 = 8	5 x 4 = 20	8 x 4 = 32	11 x 4 = 44
3 x 4 = 12	6 x 4 = 24	9 x 4 = 36	12 x 4 = 48

Week 2: Enlargement

Enlargement A transformation which alters the **size** of a shape by a **scale factor**.

scale factor A multiplier which indicates how much a shape is enlarged by:

- An **integer** (whole number) scale factor makes a shape **larger**.
- A **fractional** scale factor makes a shape **smaller**.

centre of enlargement The **point** from which a shape is enlarged. This determines the **position** of the new shape.

negative scale factor When a shape is enlarged on the opposite side of the centre of enlargement.

5 Times Tables

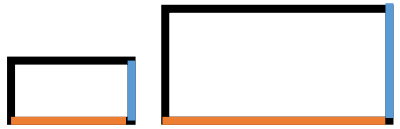
1 x 5 = 5	4 x 5 = 20	7 x 5 = 35	10 x 5 = 50
2 x 5 = 10	5 x 5 = 25	8 x 5 = 40	11 x 5 = 55
3 x 5 = 15	6 x 5 = 30	9 x 5 = 45	12 x 5 = 60

Week 3: Similarity

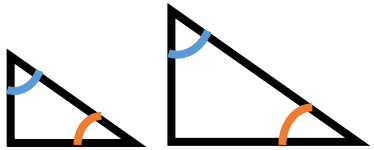
similar Shapes are mathematically similar if their **corresponding sides are proportional** and **corresponding angles are equal.**

When one shape is an enlargement of another then the two shapes are **similar**.

corresponding sides Sides in the same position on two similar shapes.



corresponding angles Angles in the same position on two similar shapes.



7 Times Tables

1 x 7 = 7	4 x 7 = 28	7 x 7 = 49	10 x 7 = 70
2 x 7 = 14	5 x 7 = 35	8 x 7 = 56	11 x 7 = 77
3 x 7 = 21	6 x 7 = 42	9 x 7 = 63	12 x 7 = 84

Extension work – Codes for related Independent Learning tasks on **Sparx Maths** *Click on 'Independent Learning' on home page then enter code in search box*

Sparx Maths

M677 Pythagoras' Theorem in 2D
M351 Angles in triangles

Sparx Maths

M178 Enlargement
U134 Enlargement by a positive or negative scale factor

Sparx Maths

U551 Understanding similarity
U578 Finding unknown sides in similar shapes

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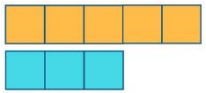
Week 4: Ratio

ratio — A comparison of one part of a whole to another part.

The ratio of **a to b** is written as $a:b$

bar model — We can use a bar model to represent ratios and help us to solve problems

eg. the ratio 5: 3



unit ratio — A ratio in the form $1:n$ or $n:1$, where one side of the ratio is **equal to 1.**

equal parts — In a ratio, all parts are of **equal size**.

equivalent ratios — Ratios with the same **proportion** of parts but using different values.

eg. $1:2 = 3:6$
$2:12 = 4:24$

simplify — Find an **equivalent ratio** which contains smaller integers.

eg. $3:12$ can be simplified to $1:4$

9 Times Tables				
	1 x 9 = 9	4 x 9 = 36	7 x 9 = 63	10 x 9 = 90
	2 x 9 = 18	5 x 9 = 45	8 x 9 = 72	11 x 9 = 99
	3 x 9 = 27	6 x 9 = 54	9 x 9 = 81	12 x 9 = 108

Week 5: Proportion

direct proportion — As one amount increases, the other amount **increases** at the same rate.

inverse proportion — As one amount increases, the other amount **decreases**.

proportion graphs

Direct proportion

Inverse proportion

currency — The money used by a country.
Pounds sterling is the British currency.

exchange rate — The ratio between two currencies:
eg. £1 = $1.20

10 Times Tables				
	1 x 10 = 10	4 x 10 = 40	7 x 10 = 70	10 x 10 = 100
	2 x 10 = 20	5 x 10 = 50	8 x 10 = 80	11 x 10 = 110
	3 x 10 = 30	6 x 10 = 60	9 x 10 = 90	12 x 10 = 120

Week 6: Prime numbers (Core knowledge recap)

prime number — An integer which is only divisible by 1 and itself. Prime numbers have **exactly two factors**.

The first twelve prime numbers are:

2	**17**
3	**19**
5	**23**
7	**29**
11	**31**
13	**37**

12 Times Tables				
	1 x 12 = 12	4 x 12 = 48	7 x 12 = 84	10 x 12 = 120
	2 x 12 = 24	5 x 12 = 60	8 x 12 = 96	11 x 12 = 132
	3 x 12 = 36	6 x 12 = 72	9 x 12 = 108	12 x 12 = 144

Extension work – Codes for related Independent Learning tasks on **Sparx Maths** *Click on 'Independent Learning' on home page then enter code in search box*

Sparx Maths

M885 Writing & simplifying ratios
M525 Sharing to a ratio
M543 Ratios in the form 1:n

Sparx Maths

M448 Graphs of direct and inverse proportion
M478 Solving proportion problems

Sparx Maths

M322 Finding prime numbers
M108 Prime factor decomposition