YEAR 9 – SIMILARITY...
Congruence, similarity & enlargement

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:

- Enlarge by a positive scale factor
- Enlarge by a fractional scale factor
- Identify similar shapes
- Work out missing sides and angles in similar shapes
- Use parallel lines to find missing angles
- Understand similarity and congruence

Keywords

Enlarge: to make a shape bigger (or smaller) by a given multiplier (scale factor)
Scale Factor: the multiplier of enlargement
Centre of enlargement: the point the shape is enlarged from
Similar: when one shape can become another with a reflection, rotation, enlargement or translation.
Congruent: the same size and shape
Corresponding: items that appear in the same place in two similar situations
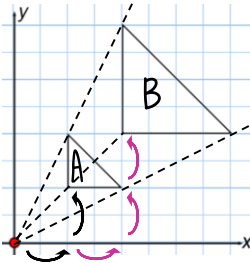**Parallel:** straight lines that never meet (equal gradients)

Positive scale factors (R)

Enlargement from a point
Enlarge shape A by SF 2 from (0,0)
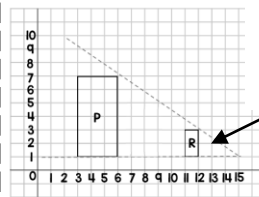
The shape is enlarged by 2

The distance from the point enlarges by 2

Fractional scale factors (R)

Fractions less than 1 make a shape SMALLER

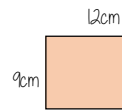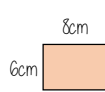R is an enlargement of P by a scale factor $\frac{1}{3}$ from centre of enlargement (15,1)

SF: $\frac{1}{3}$ – R is three times smaller than P

Identify similar shapes

Angles in similar shapes do not change.
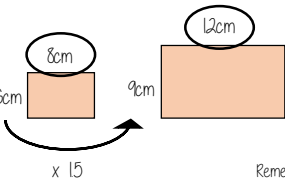e.g. if a triangle gets bigger the angles can not go above 180°

Similar shapes

8cm

6cm

12cm

9cm

Scale Factor:
Both sides on the bigger shape are 1.5 times bigger

Compare sides:	6 : 9	8 : 12
	2 : 3	**2 : 3**

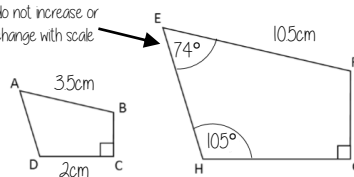Both sets of sides are in the same ratio

Information in similar shapes

8cm

6cm

12cm

9cm

x 1.5

Compare the equivalent side on both shapes

Scale Factor is the multiplicative relationship between the two lengths

Shape QBCD and EFGH are similar

Notation helps us find the corresponding sides

QB and EF are corresponding

Remember angles do not increase or change with scale

E 74° 10.5cm F

A 3.5cm B

D 2cm C

105°

H   G

Angles in parallel lines (R)
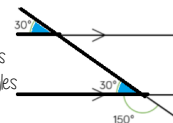
Alternate angles

55°
55°
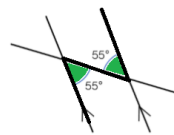
Because alternate angles are equal the highlighted angles are the same size
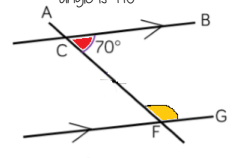
Corresponding angles

30°
30°
150°

Because corresponding angles are equal the highlighted angles are the same size

Co-interior angles

Because co-interior angles have a sum of 180° the highlighted angle is 110°

A   B
C 70°
F
G

As angles on a line add up to 180° co-interior angles can also be calculated from applying alternate/ corresponding rules first

Similar triangles

Shares a vertex

Because corresponding angles are equal the highlighted angles are the same size

Parallel lines – all angles will be the same in both triangle

As all angles are the same this is similar – it only one pair of sides are needed to show equality

Vertically opposite angles

All the angles in both triangles are the same and so similar