

---

# Year 08

## Maths

---

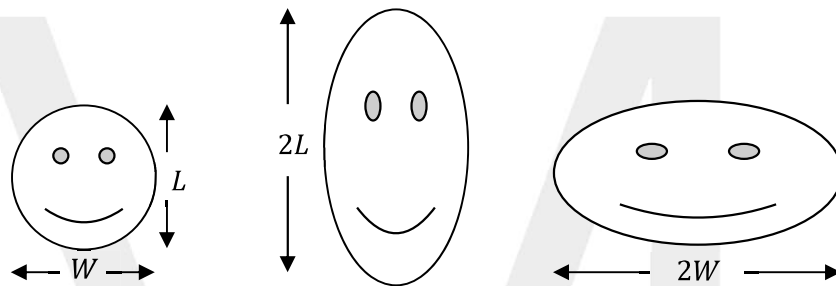
### Lesson 3

### Similarity 1 (Stage 5.1)

# 1. Introduction to Similarity

## □ Identifying Similar Shapes

- The figures below show variations of a smiley face.
  - The first smiley is the original. It has length  $L$  and width  $W$ .
  - The second smiley has had its length doubled to  $2L$ . Its width is  $W$ .
  - The third smiley has had its width doubled to  $2W$ . Its length is  $L$ .



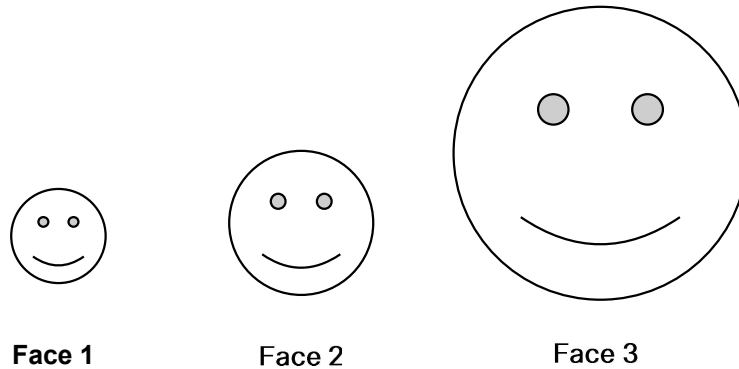
- Obviously, these shapes do not look the same. They are **not similar**.
- What does it mean when we say a shape is **not congruent**? <sup>[1]</sup>

**Similarity** means to have the **same shape**, but different size.

Whilst, **congruency** means to have the **same shape**, and **same size**.

Hence, similarity does not mean when the shape is “stretched”.

- Now consider the three smiley faces below.



- Measure the length and width of these faces to complete the table below.

	Face 1	Face 2	Face 3
Length			
Width			

- What is the ratio of Face 1's length to Face 2's length?

---

- What is the ratio of Face 1's width to Face 2's width?

---

- What is the ratio of Face 1's length to Face 3's length?

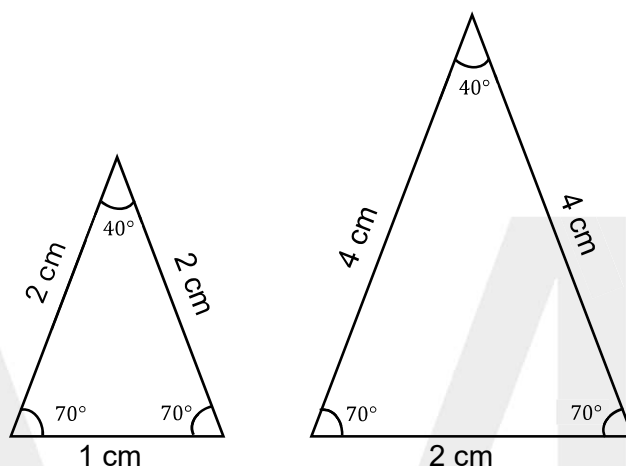
---

- What is the ratio of Face 1's width to Face 3's width?

---

- The length and width of Face 1 have **increased in the same ratio**. Therefore, we can say that Face 2 and Face 3 are **enlargements** of Face 1.

- A figure and its enlargement are called **similar figures**. Similar figures have the same shape but are not the same size.
- In similar figures, all corresponding sides are in ratio. This ratio is referred to as the scale factor.
- The scale factor for the triangles below is 1: 2. All dimensions have doubled.



#### Discussion question

Are congruent figures similar? [2]

What does a scale factor 2: 1 mean? [3]

If the scale factor is ***small number: large number***, then this is an **enlargement** as the small number is “going to” the larger number.

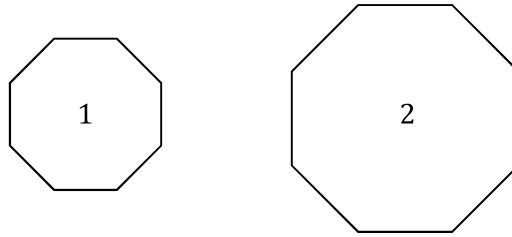
If the scale factor is ***number : small number***, then this is a **reduction** factor as the large number is “going to” the smaller number.

Hence, the scale factor identifies the enlargement or reduction of similar figures.

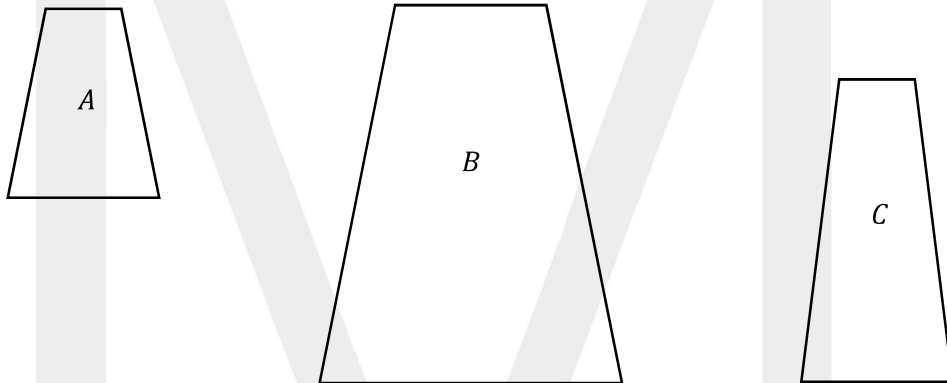
### Concept Check 1.1

Measure the following figures to determine which are similar. For the similar figures, state the scale factor involved.

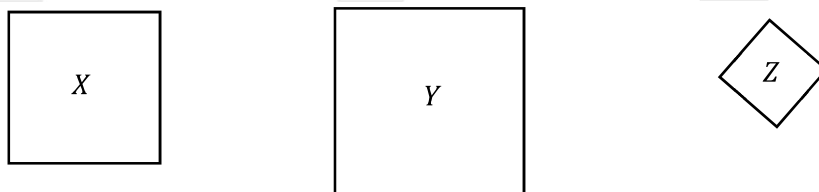
(a) <sup>[4]</sup>



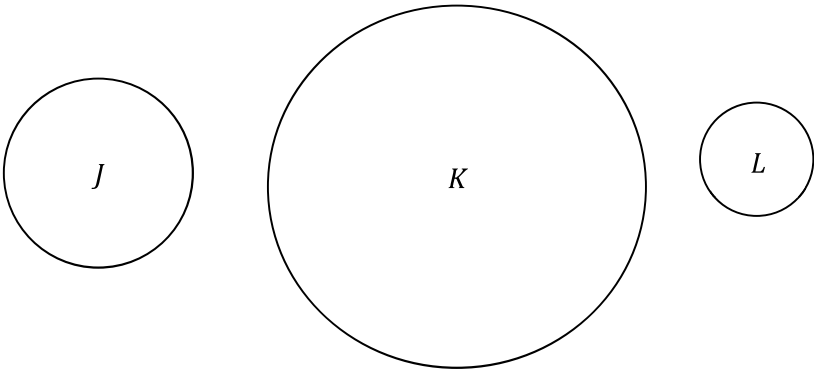
(b) <sup>[5]</sup>



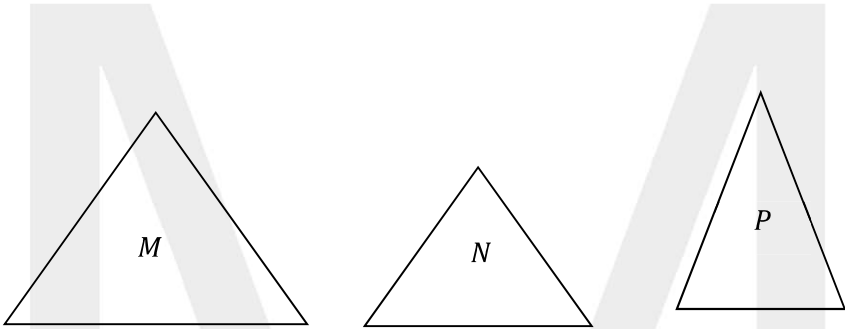
(c) <sup>[6]</sup>



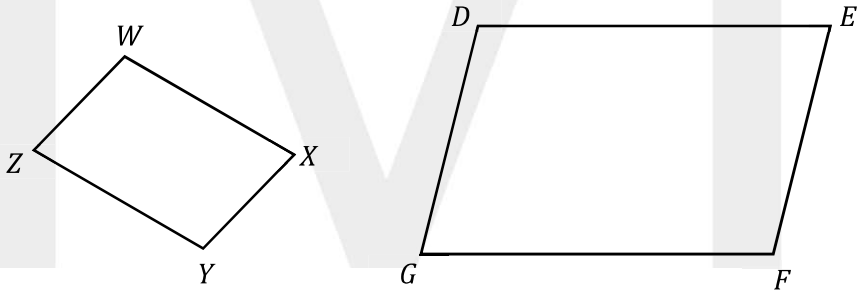
(d) [7]



(e) [8]



(f) [9]



**Note to students**

Similar figures may not have the same orientation. Always match the corresponding sides to the corresponding angles to determine whether they are similar.

**Concept Check 1.2**

Determine whether the following statements are true or false. Give a reason or example to justify your answer.

(a) All circles are similar. <sup>[10]</sup>

---

---

(b) All right-angled triangles are similar. <sup>[11]</sup>

---

---

(c) All rhombuses are similar. <sup>[12]</sup>

---

---

(d) All equilateral triangles are similar. <sup>[13]</sup>

---

---

(e) All squares are similar. <sup>[14]</sup>

---

---

(f) All rectangles are similar. <sup>[15]</sup>

---

---