

Student Name: _____	Grade: _____
Date: _____	Score: _____

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7 Year 8 Term 4 Week 7 Homework

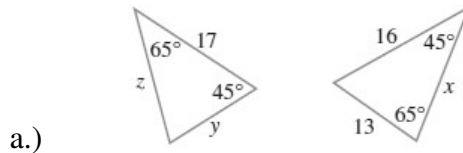
7.1 Congruence and Similarity

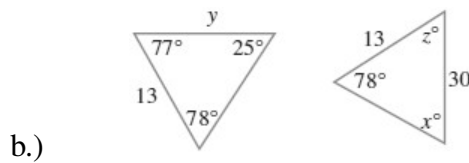
7.1.1 Congruent triangles

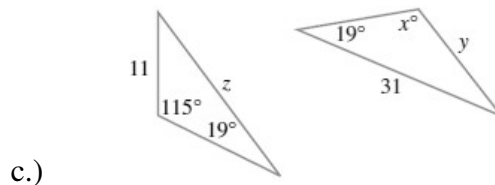
In congruent triangles:

- the matching sides are equal in length
- the matching angles are equal
- the matching sides lie opposite the equal angles.
- symbol for ‘is congruent to’ is \cong .

Exercise 7.1.1 The triangles below are congruent. Find the value of all pronumerals:





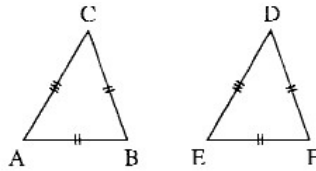


7.1.2 The 4 congruency tests

To mathematically prove that one triangle is congruent to another. We only need to find 3 facts that are the same in both triangles:

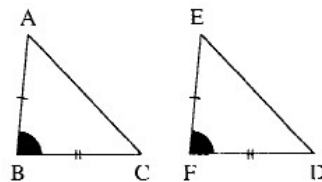
- Two triangles are congruent if 3 sides of one are respectively equal to 3 sides of the other.

$$\triangle ABC \equiv \triangle DEF \text{ (SSS)}$$



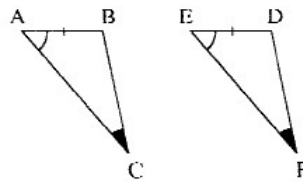
- Two triangles are congruent if 2 sides and the included angle of one are respectively equal to 2 sides and the included angle of the other.

$$\triangle ABC \equiv \triangle DEF \text{ (SAS)}$$



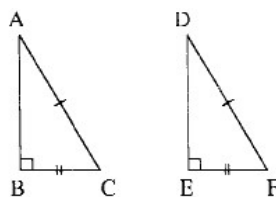
- Two triangles are congruent if 2 angles and a side of one are respectively equal to 2 angles and the corresponding side of the other.

$$\triangle ABC \equiv \triangle DEF \text{ (AAS)}$$



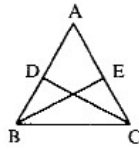
- Two right angle triangles are congruent if the hypotenuse and a side of one are respectively equal to the hypotenuse and a side of other.

$$\triangle ABC \equiv \triangle DEF \text{ (RHS)}$$

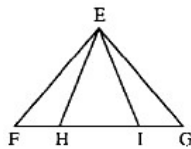


Exercise 7.1.2

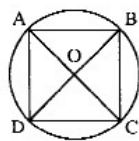
1. $DB = EC$ and $\angle BDC = \angle BEC = 90^\circ$. Prove that $\triangle BDC \cong \triangle BEC$



2. $\triangle EFG$ is isosceles, $FH = IG$. Prove that $EH = EI$.



3. $ABCD$ is a square. O is the centre of the circle. Prove that $AC \perp BD$

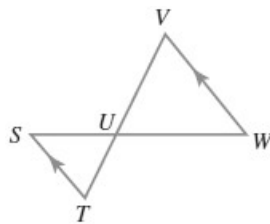


7.1.3 Similar triangles

In similar triangles:

- the matching sides are in the same ratio
- the matching angles are equal
- the matching sides lie opposite the equal angles.
- the symbol for 'is similar to' is \sim

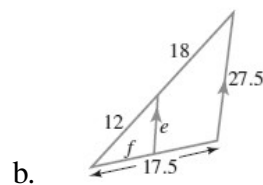
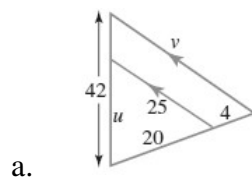
Exercise 7.1.3 The triangles in this figure are similar.



1. Mark on it all pairs of equal angles.
2. Name the similar triangles, giving the matching vertices in the correct order.

3. Write a statement that shows the equal ratios of matching sides.

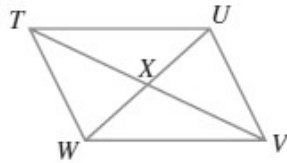
Exercise 7.1.4 Find the value of all pronumerals in these similar triangles. All measurements are in cm.



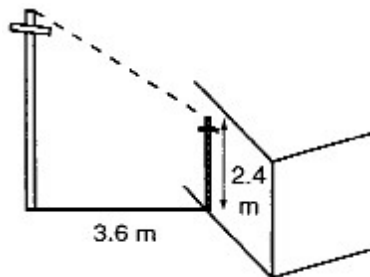
7.1.4 Miscellaneous exercise

Exercise 7.1.5

1. *TUVW* is a parallelogram. Mark all pairs of equal sides and equal angles in triangles *TXW* and *UXV*, hence name the congruent triangles with the vertices in matching order.



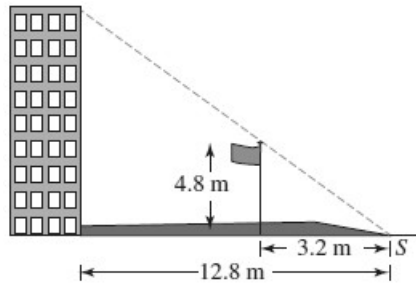
2. The diagram below shows the shadow of a telegraph pole being cast on a wall. At the same time a stick 1 m high and perpendicular to the ground casts a shadow 1.5 m long.



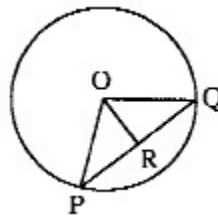
- (a) *If the wall didn't exist, how long would the shadow of the telegraph pole be?*

- (b) *How high is the telegraph pole?*

3. A 4.8 m high flagpole casts a shadow of 3.2 m. At the same time the shadow of a nearby building falls at the same point (S). The shadow cast by the building measures 12.8 m How high is the building?



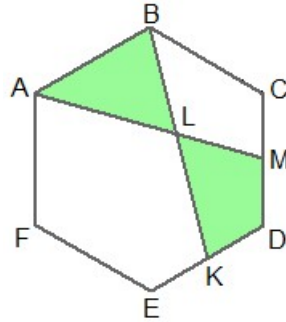
4. O is the centre of a circle. $\angle PRO = \angle ORD = 90^\circ$. Prove that $PR = RQ$.



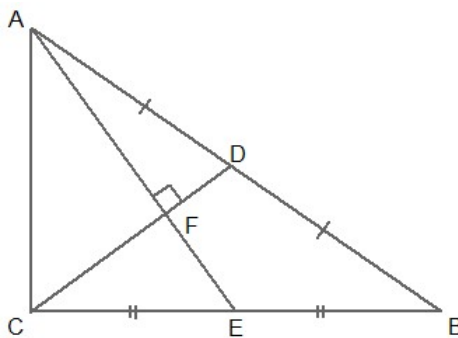
7.1.5 Maths challenge

Exercise 7.1.6

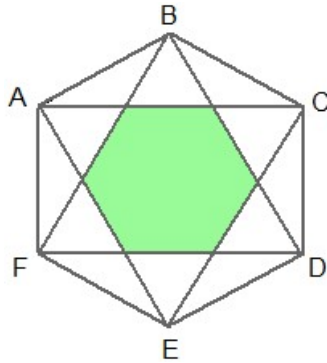
1. Given $ABCDEF$ is a regular hexagon. M and K are the mid-points of CD and DE respectively, L is the point of intersection of AM and BK . If the area of $\triangle ABL$ is 10cm^2 , find the area of the quadrilateral $MLKD$.



2. In $\triangle ABC$, medians BE and CD are perpendicular to each other. If $AE = 7\text{ cm}$ and $CD = 6\text{ cm}$, find the area of $\triangle ABC$.



3. $ABCDEF$ is a regular hexagon. If the area of the hexagon has a area of 90 cm^2 , find the area of the shaded part.



4. $ABCD$ is a rectangle. $AB = 30 \text{ cm}$ and $BC = 20 \text{ cm}$. The diagonal AC extend to a E such that $CE = AC$. Find the length of DE .

