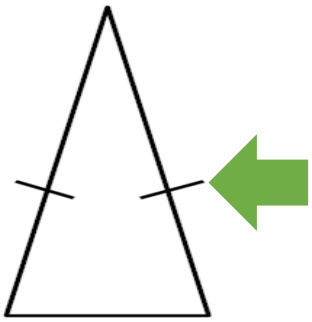
Geometry of 2D shapes

NOTES & ACTIVITIES

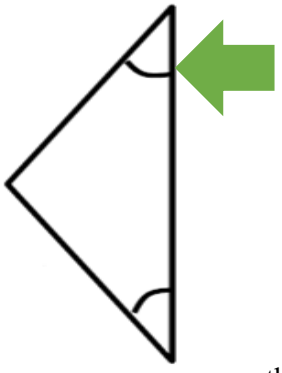
GRADE 8

TRIANGLES

Understanding Notation



Hash marks on the line segments mean these **two sides are the same length.**

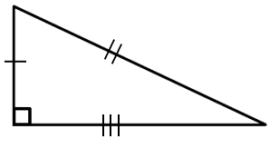


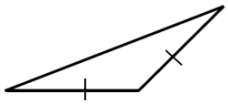
Arc marks on angles mean these **two angles have the same size.**

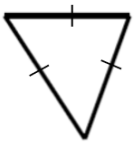
Classify each triangle by sides and by angles.

Class activity 1

Classify each triangle by sides:

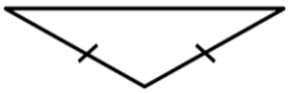
1. 

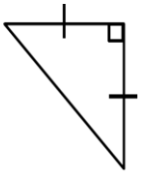
2. 

3. 

Classify each triangle by angles:

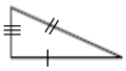
4. 

5. 

6. 

Exercise 1

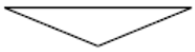
A. Classify each triangle by its **sides**:

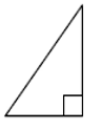
1.  _____

2.  _____

3.  _____

B. Classify each triangle by its **angles**:

4.  _____

5.  _____

6.  _____

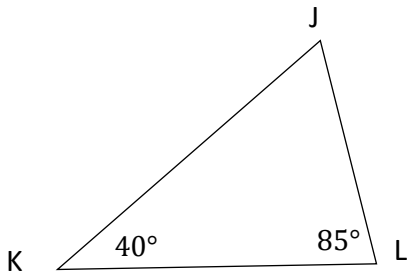
7.  _____

Investigation Task 1:

The Sum Of The Interior Angles Of Triangles

Class activity 2

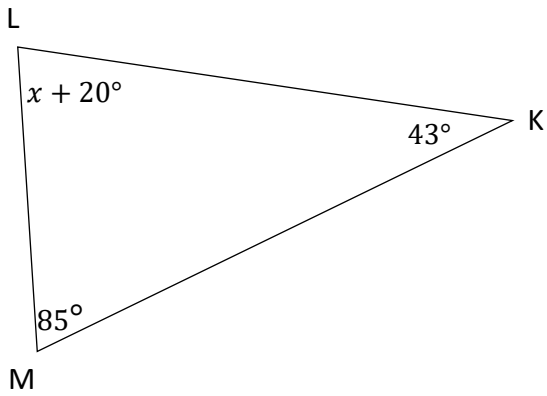
Determine, with reasons, the size of $\hat{J}$.



Statement	Reason

Class activity 3

Determine, with reasons, the size of x.

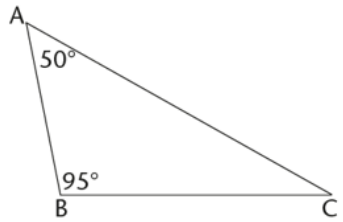


Statement	Reason

Exercise 2

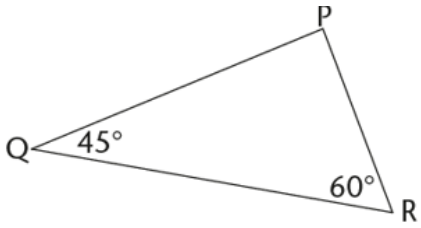
Find, **giving reasons**, the sizes of unknown angles in the following triangles.

1. Find the size of $\hat{C}$



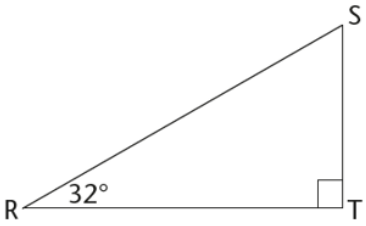
Statement	Reason

2. Find the size of $\hat{P}$



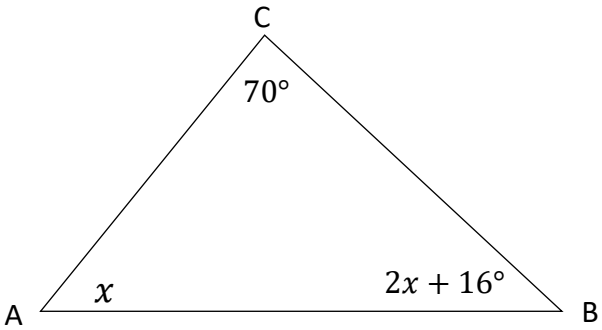
Statement	Reason

3. Find the size of $\hat{S}$



Statement	Reason

4. Find the size of x



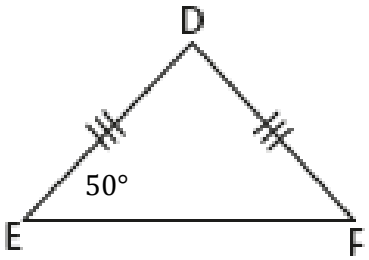
Statement	Reason

Investigation Task 2 and 3:

Special Triangles

Class activity 4

Determine, with reasons, the size of $\hat{F}$ and $\hat{D}$.

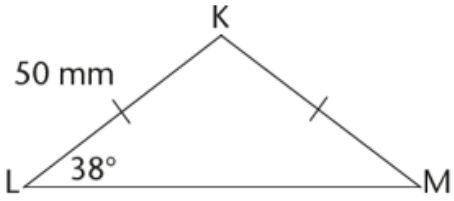


Statement	Reason

Class activity 5

a) Find the length of KM

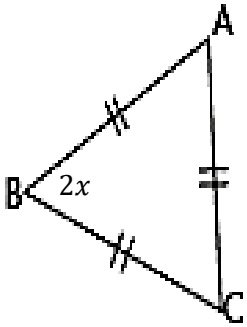
b) Find the size of $\hat{K}$



Statement	Reason

Class activity 6

Determine, with reasons, the value of x



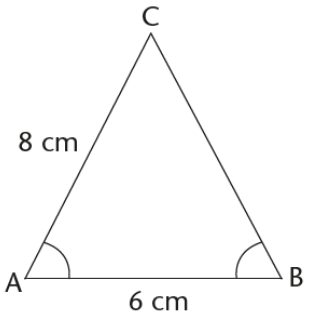
Statement	Reason

Exercise 3

Find, **giving reasons**, the sizes of unknown angles in the following triangles.

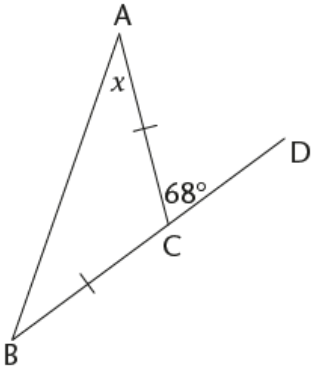
1. a) Find CB.

   b) Find $\hat{C}$ if $\hat{A} = 50°$

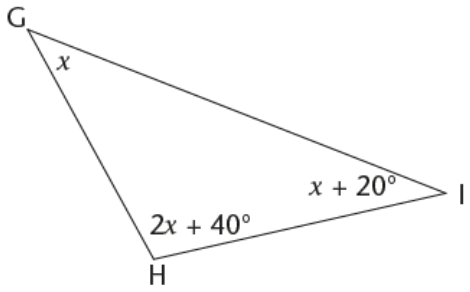


2. BCD is a straight line segment.

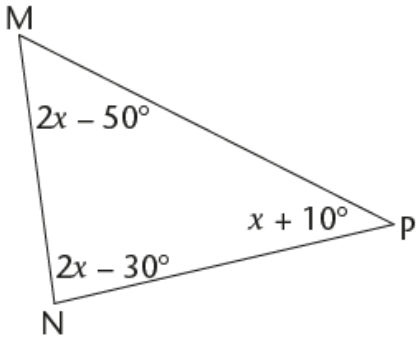
   Calculate the size of x.



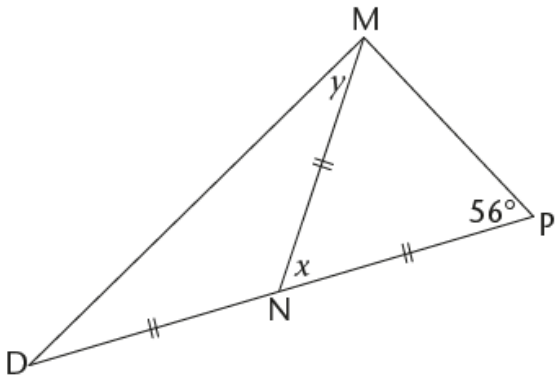
3. Calculate the size of x and the size of. $\widehat{H}$.



4. Calculate the size of $\widehat{N}$.



5. DNP is a straight line. Determine the size of x and y.



QUADRILATERALS

Understanding Notation

Sides:

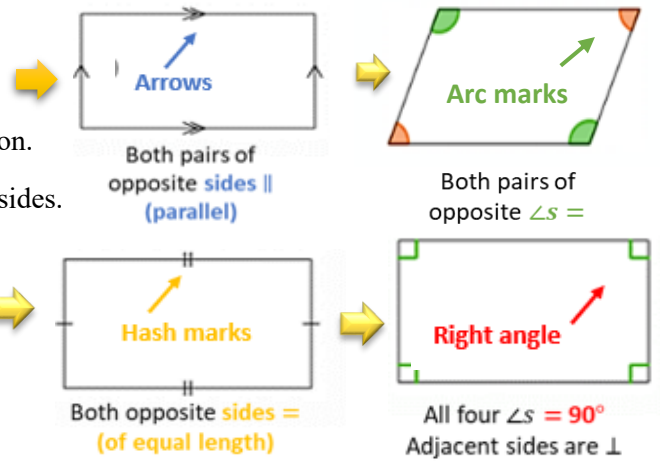
Parallel (∥) is shown with **arrows** pointing in the same direction.

Equal (=) is marked with matching **hash marks**, same length sides.

Perpendicular Sides (⊥) meet at **90° angles.**

Angles:

Equal Angles are marked with matching **arc marks.**



Exercise 4: Properties Of Quadrilaterals

Use the ADDENDUM on pages (i) –(iii) to answer the following questions for each of the given quadrilaterals.

1. Parallelogram

1.1 Complete the following statements:

a) KL ∥…… b) KN ∥…….

1.2 What can you conclude about the opposite sides of a parallelogram?

1.3 Measure the length of the following sides:

a) KL _____ b) KN_____

c) NM_____ d) ML_____

1.4 What can you conclude about the length of the opposite sides of a parallelogram?

1.5 Use your knowledge of parallel lines to determine the size of the following angles:

a) $K\hat{N}M$_____ b) $K\hat{L}M$_____ c) $L\hat{M}N$_____

1.6 What can you conclude about the size of the opposite angles of a parallelogram

Exercise 4 (continue)

2. Rhombus

2.1 Complete the following statements:

a) JM ‖…… b) JK ‖……

2.2 What can you conclude about the opposite sides of a rhombus?

2.3 Measure the length of the following sides:

a) JM _____ b) ML _____

c) KL _____ d) JK _____

2.4 What can you conclude about the length of the opposite sides of a rhombus?

2.5 Use your knowledge of parallel lines to determine the size of the following angles:

a) M$\hat{J}K$_____ b) M$\hat{L}K$_____ c) L$\hat{K}J$_____

2.6 What can you conclude about the size of the interior angles of a rhombus?

3. Rectangle

3.1 Complete the following statements:

a) DE ‖…… b) DG ‖……..

3.2 What can you conclude about the opposite sides of a rectangle?

3.3 Measure the length of the following sides:

a) DE _____ b) DG_____

c) GF_____ d) EF_____

3.4 What can you conclude about the length of the opposite sides of a rectangle?

3.5 Use your knowledge of parallel lines to determine the size of the following angles:

a) D$\hat{G}F$_____ b) G$\hat{F}E$_____ c) F$\hat{E}D$_____

3.6 What can you conclude about the size of the interior angles of a rectangle?

4. Square

4.1 Complete the following statements:

a) AD ‖…… b) AB ‖……

4.2 What can you conclude about the opposite sides of a square?

Exercise 4 (continue)

4.3 Measure the length of the following sides:

a) AD_____ b) AB_____

c) BC_____ d) DC_____

4.4 What can you conclude about the length of the opposite sides of a square?

4.5 Use your knowledge of parallel lines to determine the size of the following angles:

a) $A\hat{D}C$_____ b) $D\hat{C}B$_____ c) $A\hat{B}C$_____

4.6 What can you conclude about the size of the interior angles of a square?

5. Trapezium

5.1 Write down the pair of parallel sides.

5.2 What can you conclude about the opposite sides of a trapezium?

5.3 Measure the length of the following sides:

a) RU_____ b) RS_____

c) ST_____ d) TU_____

5.4 What can you conclude about the length of the opposite sides of a trapezium?

5.5 Use your knowledge of parallel lines to determine the size of the following angles:

a) $R\hat{U}T$_____ b) $S\hat{T}U$_____

5.6 What can you conclude about the size of the interior angles of a trapezium?

6. Kite

6.1 Are there any parallel sides?

6.2 What can you conclude about the opposite sides of a kite?

6.3 Measure the length of the following sides:

a) AD_____ b) AB_____

c) DC_____ d) BC_____

6.4 What can you conclude about the length of the sides of a kite?

6.5 Measure the size of the following angles:

a) $\hat{A}$_____ b) $\hat{B}$_____

c) $\hat{C}$_____ d) $\hat{D}$_____

6.6 What can you conclude about the size of the interior angles of a kite?

Exercise 5

a) Use your answers in Exercise 3.

Copy the following table and place a ✓ in the correct box to show which property is correct for each shape.

Properties	Parallelogram	Rectangle	Rhombus	Square	Kite	Trapezium
Only one pair of sides are parallel						
Opposite sides are parallel						
Opposite sides are equal						
All sides are equal						
Two pairs of adjacent sides are equal						
Opposite angles are equal						
All angles are equal						

b) Add up the four angles of each quadrilateral in Exercise 3.

What do you notice about the sum of the angles of each quadrilateral?

Parallelogram

_____

Rhombus

_____

Rectangle

_____

Kite

_____

Square

_____

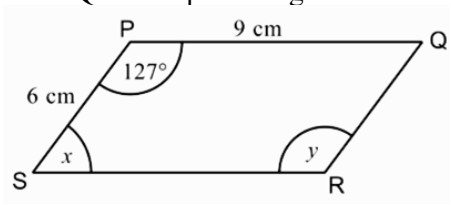
Finding unknown angles and sides in quadrilaterals

Class activity 7

Determine the following, giving reasons:

1. the value of x and y
2. the lengths of QR and RS

PQRS is a parallelogram.



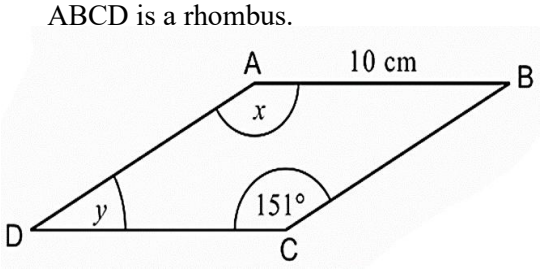
Class activity 8

Find the following, giving the reasons:

a) the values of x and y

b) the lengths of AD and DC

ABCD is a rhombus.



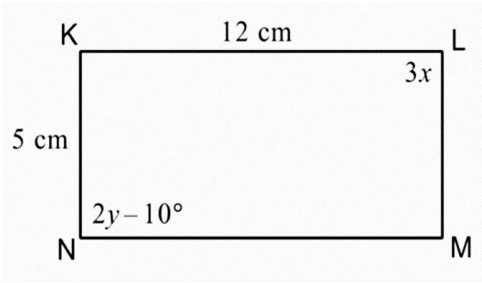
Class activity 9

Find the following, giving the reasons:

a) the values of x and y

B) the lengths of AD and DC

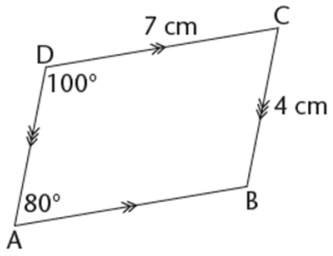
KLMN is a rectangle.



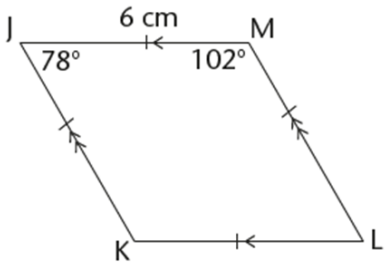
Exercise 6

Find the length of all the **unknown sides** and **angles** in the following quadrilaterals. Give reasons to justify your statements. (**Also, recall that the sum of the angles of a quadrilateral is 360°.**

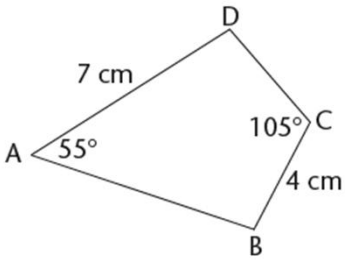
1.



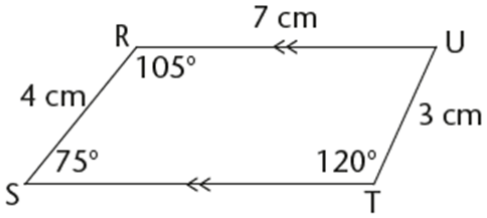
2.



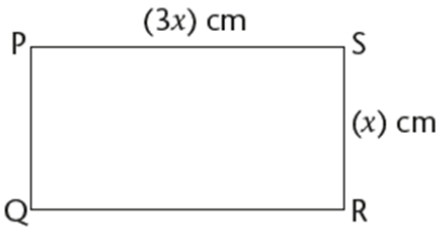
3. ABCD is a kite.



4. The perimeter of RSTU is 23 cm.



5. PQRS is a rectangle and has a perimeter of 40 cm.



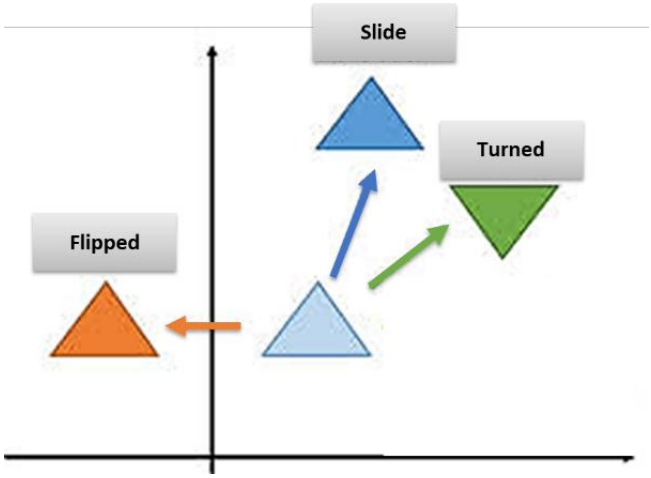
CONGRUENCY

Understanding Congruent Shapes

What are congruent shapes?

a) Congruent shapes have the **same size** and **shape**.

b) This applies regardless of whether the shape is **flipped**, **turned, or sliding**.



Class activity 10

Complete the table below:

	Examples	Are They Congruent?	Why?
Example:	Two bricks from the same pile	Yes	Same size and shape
	Two biscuits from the same pack		
	Two different size tiles		
	Two pages from the same book		
	One big and one small pencil		

Exercise 7

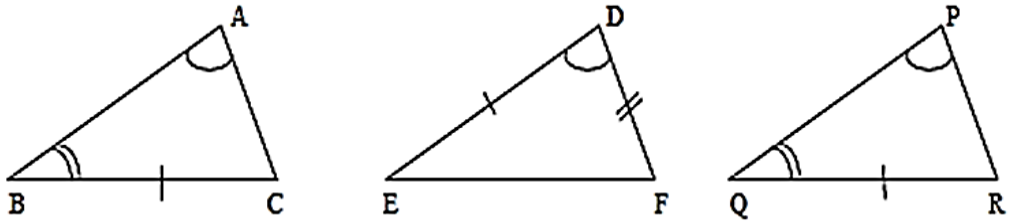
Copy the following table and write down which angles and sides are equal between each pair of congruent figures:

1. ΔPQR ≡ ΔUCT Angles: Sides:	**2. ΔKLM ≡ ΔUWC** Angles: Sides:
3. ΔGHI ≡ ΔQRT Angles: Sides:	**4. ΔKJL ≡ ΔPOQ** Angles: Sides:

Exercise 8: Identifying Congruent Angles and Sides

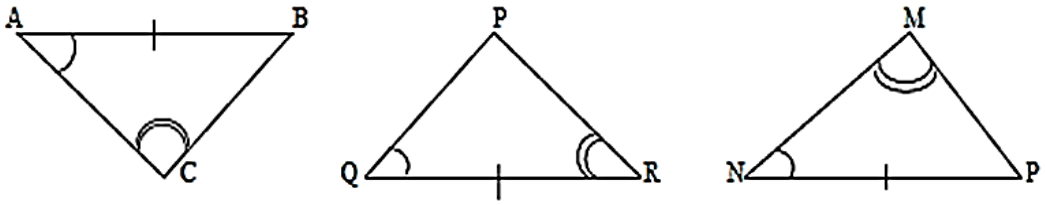
Which triangle is congruent to ΔABC?

a)



ΔABC ≡ _____

b)



ΔABC ≡ _____

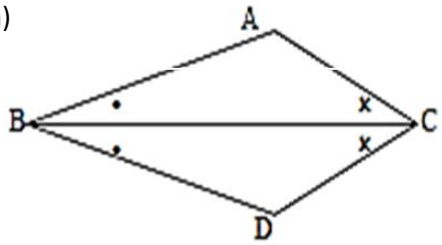
Exercise 9

Name a pair of congruent triangles in each figure.

If necessary, mark any equal sides or angles that are not marked.

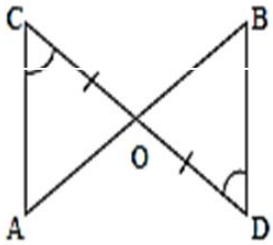
Remember to name the corresponding vertices in the correct order.

a)



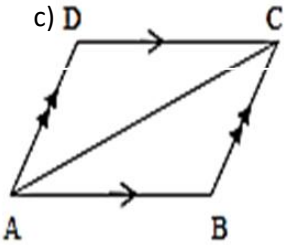
_____

b)



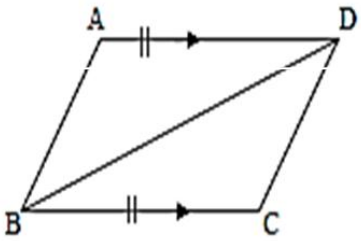
_____

c)



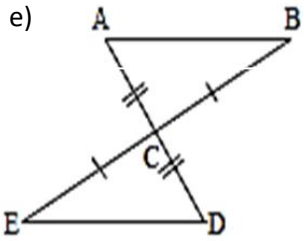
_____

d)



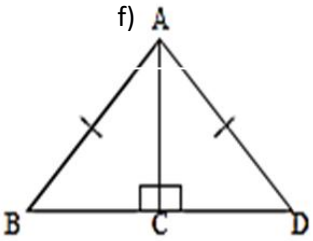
_____

e)

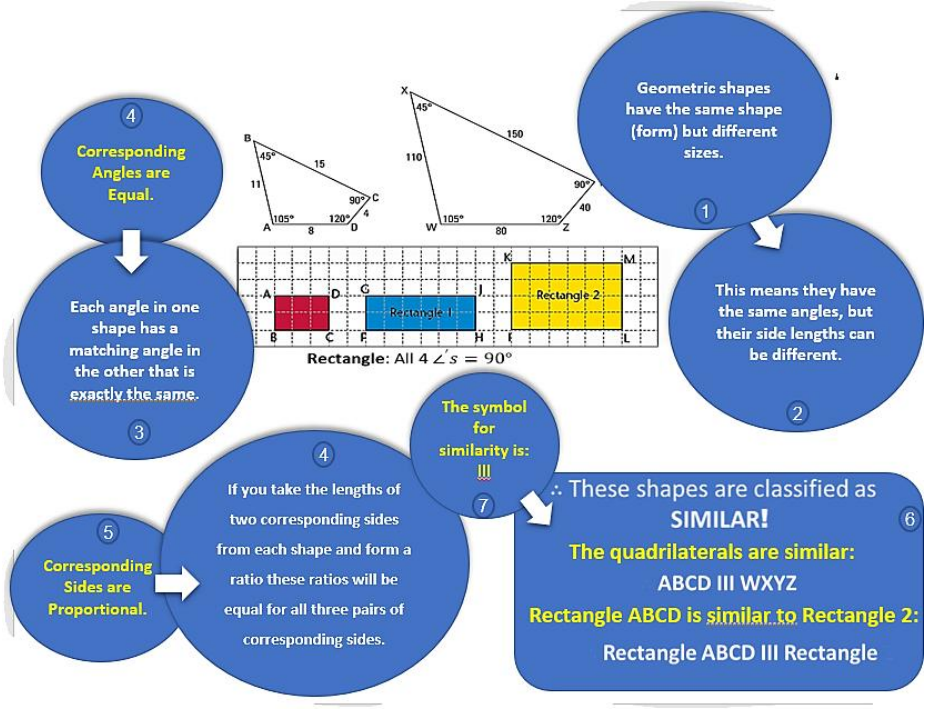


_____

f)



_____



Class activity 11

The trapezium ABCD is similar to trapezium PQRS.



a) Name the corresponding angles.

b) Name the corresponding sides.

(a) Corresponding angles:

∠ A and ∠P
∠ B and ∠Q
∠ C and ∠R
∠ D and ∠S

(b) Corresponding sides:

Side AB and Side PQ
Side BC and Side QR
Side CD and Side RS
Side AD and Side PS

Exercise 10

1. The figures are similar. JKLM III WX`



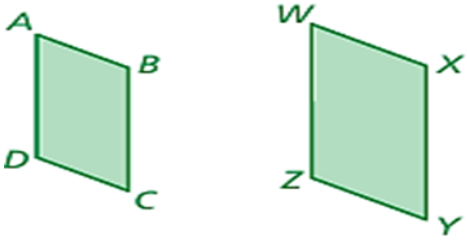


1.1 Name the corresponding angles

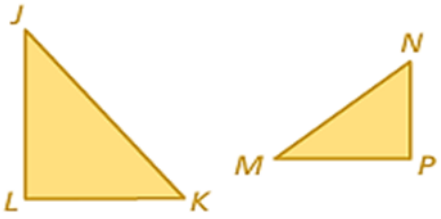
1.2 Name the corresponding sides.

2. Name the corresponding angles and the corresponding sides of the similar figures below.

2.1



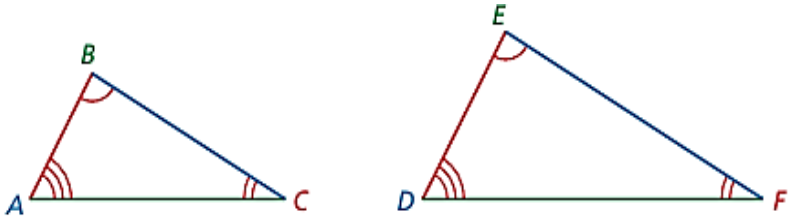
2.2



Identifying Similar Figures

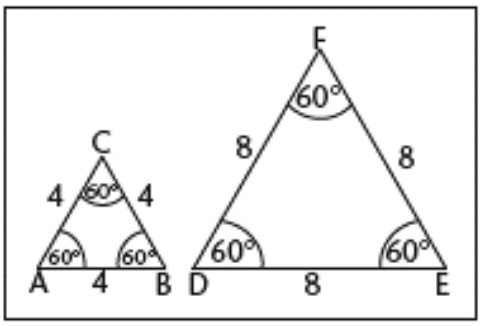
Revision Question 1

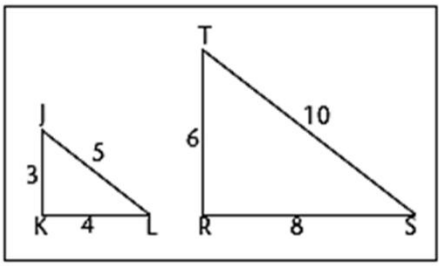
Name the corresponding angles and the corresponding sides of the similar figures below.



Revision Question 2

Are the triangles in each pair similar? Give a reason for each answer.

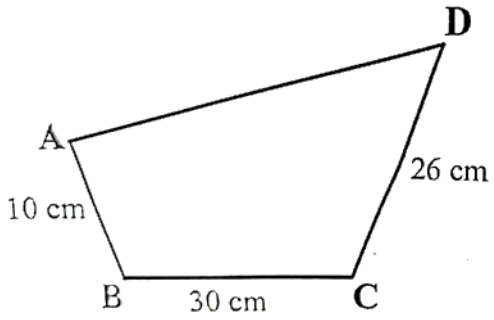


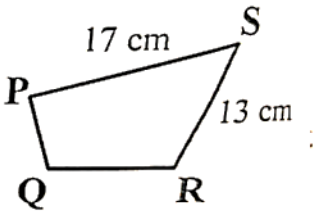


Exercise 11: Sorting Activity (Separate document)

Exercise 12

1. In the following diagram, ABCD III PQRS.





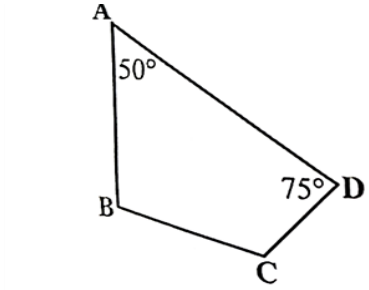
1.1 Complete the following statement, giving your answer as a numerical ratio in simplified form.

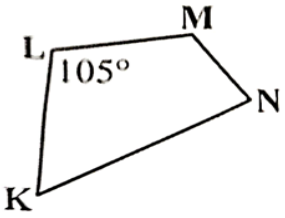
$\frac{CD}{RS} = __ = __$

1.2 Determine the length of each of the following sides.

1.2.1 AD = 1.2.2 PQ = 1.2.3 QR =

In the following diagram, ABCD|||KLMN.





2.1 Complete the following statements using the correct letters.

2.1.1 ABCD|||KLMN means that …

$\hat{A} = \widehat{\ }$, $\hat{B} = \widehat{\ }$ and $\hat{D} = \widehat{\ }$

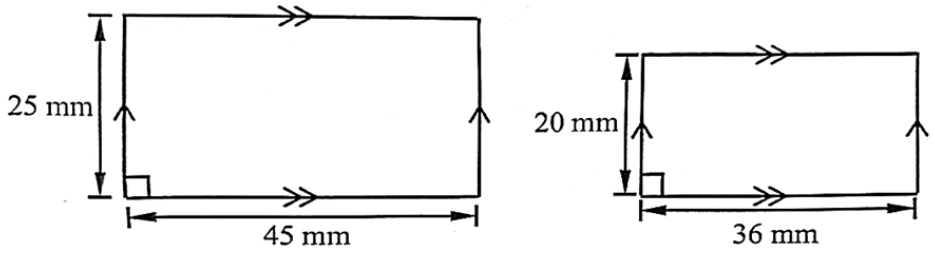
2.1.2 ABCD|||KLMN also means that ….

$\underline{AB} = \underline{BC} = \underline{CD} = \underline{DA}$

2.2 Determine the size of each of the following angles.

2.2.1 $\widehat{K}$ = 2.2.2 $\widehat{N}$ = 2.2.3 $\hat{C}$ =

2. Consider the following pair of rectangles.



3.1.1 Are the pairs of corresponding angles equal?

3.1.2 Are the pairs of corresponding sides proportional?

3.1.3 Are these two rectangles similar?

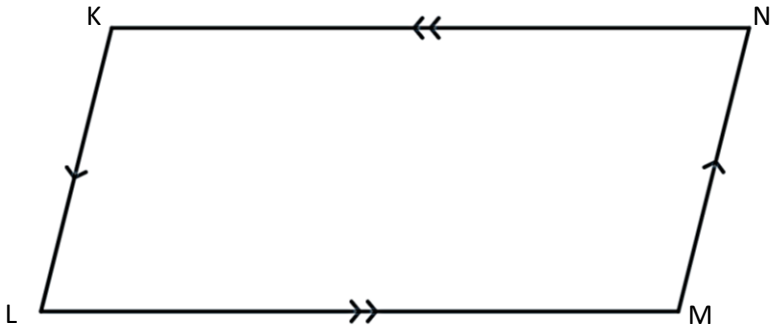
Consolidation Task:

Geometry of 2D Shapes

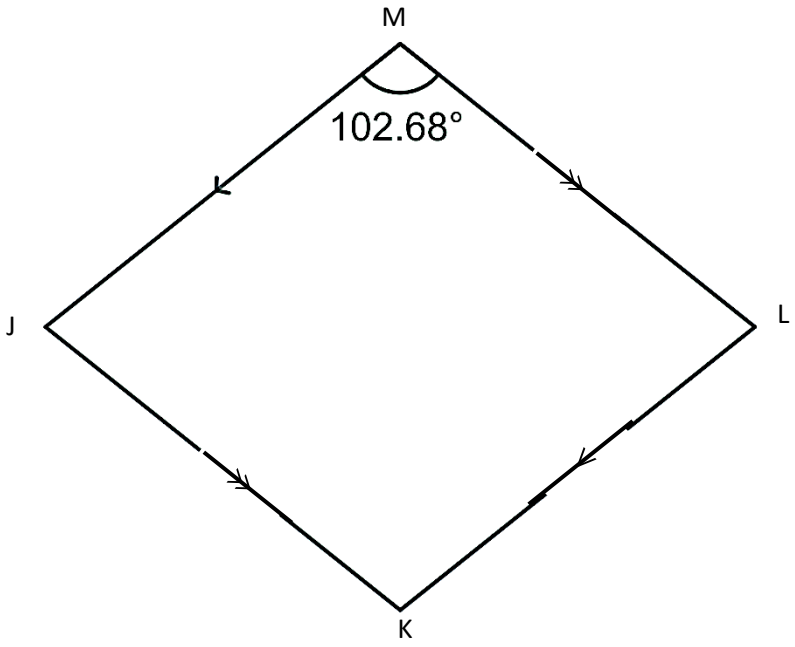
ADDENDUM

Exercise 4: Properties Of Quadrilaterals (Do ALL measuring on the shapes below!)

1.



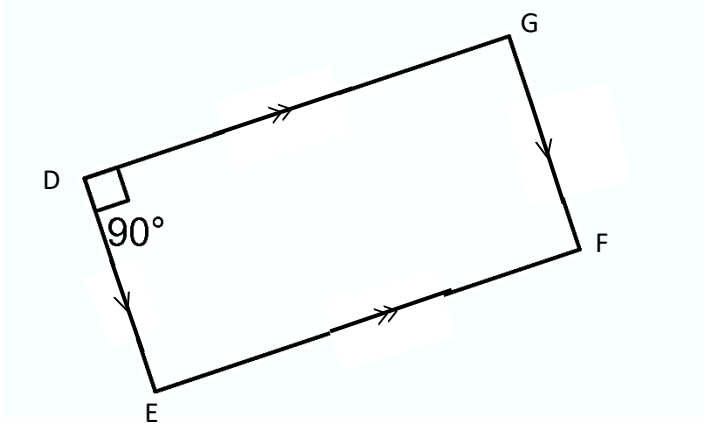
2.



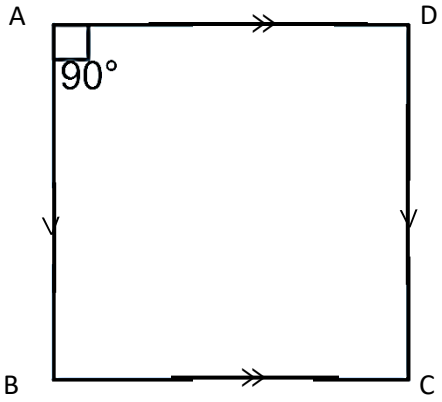
ADDENDUM

Exercise 4: Properties Of Quadrilaterals (Do ALL measuring on the shapes below!)

3.



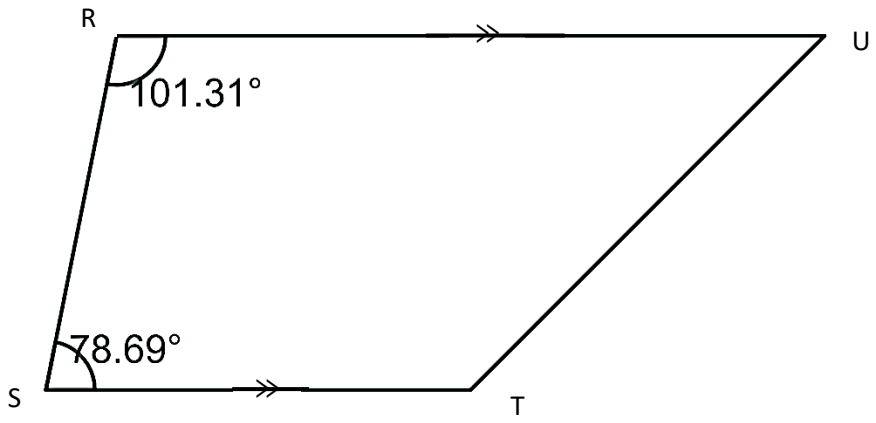
4.



ADDENDUM

Exercise 4: Properties Of Quadrilaterals (Do ALL measuring on the shapes below!)

5.



6.

