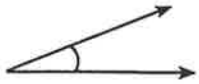
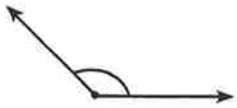
Introduction and Review

1. Angles

   a) Acute – angle between 0° and 90°

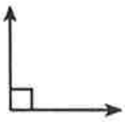


   b) Obtuse – angle between 90° and 180°



   c) Straight – angle exactly 180°

   d) Right – angle exactly 90°
   (note symbol used to indicate
   a right angle)

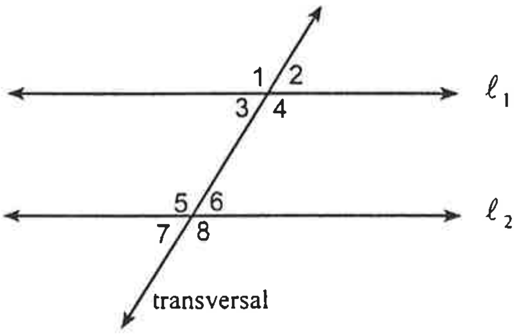


   e) Reflex – angle between 180° and 360°

   f) Complementary – two angles that add up to 90°

   g) Supplementary – two angles that add up to 180°

2. Four types of angles developed from parallel lines and a transversal.



$\ell_1 \parallel \ell_2$

Vertically opposite angles

$\angle 1 = \angle 4$
$\angle 2 = \angle 3$
$\angle 5 = \angle 8$
$\angle 6 = \angle 7$

Corresponding angles

$\angle 1 = \angle 5$
$\angle 2 = \angle 6$
$\angle 3 = \angle 7$
$\angle 4 = \angle 8$

Alternate interior angles

$\angle 3 = \angle 6$
$\angle 4 = \angle 5$

Co-interior angles

$\angle 3 + \angle 5 = 180°$
$\angle 4 + \angle 6 = 180°$

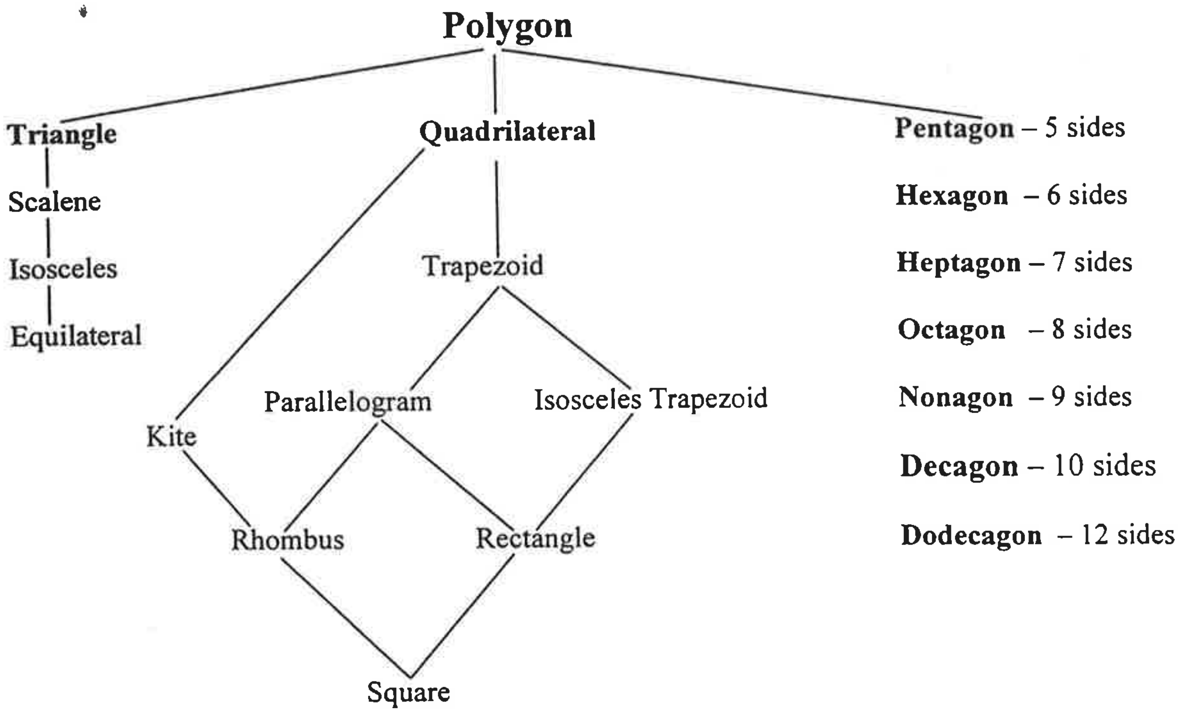
3. Line vs. line segment

line segment $\overline{AB}$

line $\overleftrightarrow{AB}$

4. Properties of a polygon

Definition of a polygon: The union of 3 or more segments such that each segment intersects exactly two others, one at each of its endpoints (its vertices)



a) Triangle – 3 sided polygon

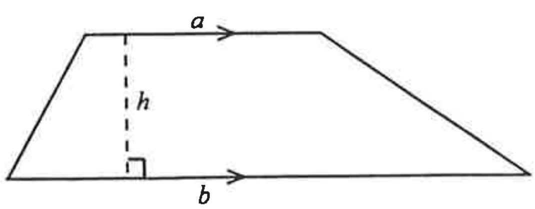
- sum of interior ∠'s is 180°
- area = $\dfrac{\text{base x height}}{2}$, $A = \frac{1}{2}bh$

i) scalene – a triangle with no sides of the same length.
ii) isosceles – a triangle with two sides equal and two angles equal (= sides ↔ = ∠'s)
iii) equilateral – a triangle with all three sides equal and all three angles equal.

b) Quadrilateral – 4 sided polygon

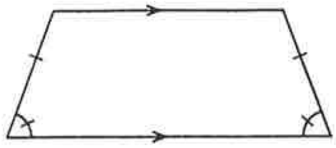
- sum of interior ∠'s is 360°

i) trapezoid – a quadrilateral with one pair of parallel sides.

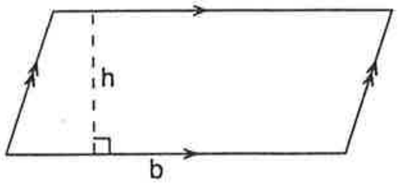


Area of trapezoid: $A = \frac{1}{2}h(a+b)$

ii) isosceles trapezoid – a trapezoid with a pair of base angles equal and non-parallel sides equal.



iii) parallelogram – a quadrilateral with two pairs of parallel sides.



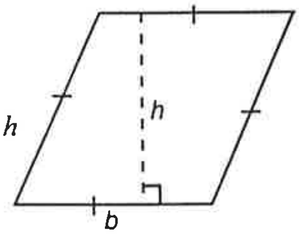
Area = $b \cdot h$

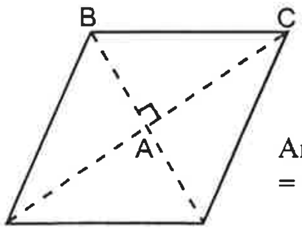
Ways of showing that a quadrilateral is a parallelogram:

- both pairs of opposite sides are parallel.
- both pairs of opposite sides are equal.
- one pair of opposite sides are parallel and equal.
- diagonals bisect each other.
- opposite angles are equal.
- all pairs of consecutive angles are supplementary.

iv) Rhombus – a quadrilateral with four equal sides.

Area = $b \cdot h$



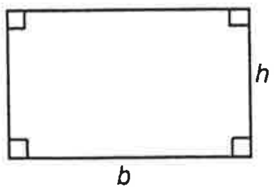


Area of a rhombus
= 4 times area of ΔABC

Important properties of a rhombus:

- the diagonals of a rhombus are perpendicular to each other.
- each diagonal of a rhombus bisects a pair of opposite angles.
- the rhombus has all the properties of a parallelogram.

v) Rectangle – a quadrilateral with four equal angles.

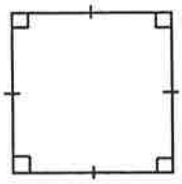


Area = $b \cdot h$

Important properties of a rectangle.

- the diagonals of a rectangle are equal.
- the rectangle has all the properties of a parallelogram.

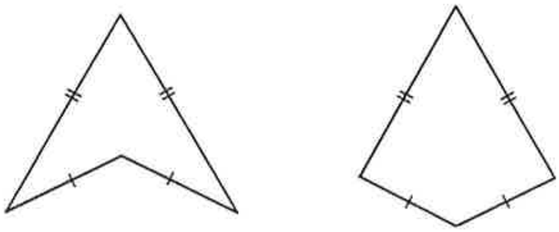
vi) Square – a quadrilateral with four equal sides and four equal angles.



Important properties of a square.

- the square has all the properties of a rhombus and a rectangle

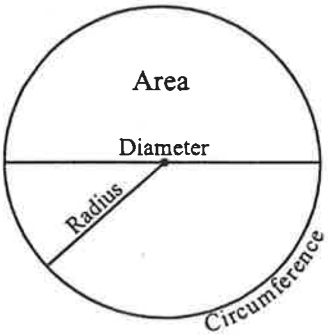
vii) Kite – a quadrilateral with two distinct pairs of consecutive sides of the same length.



Important properties of a kite.

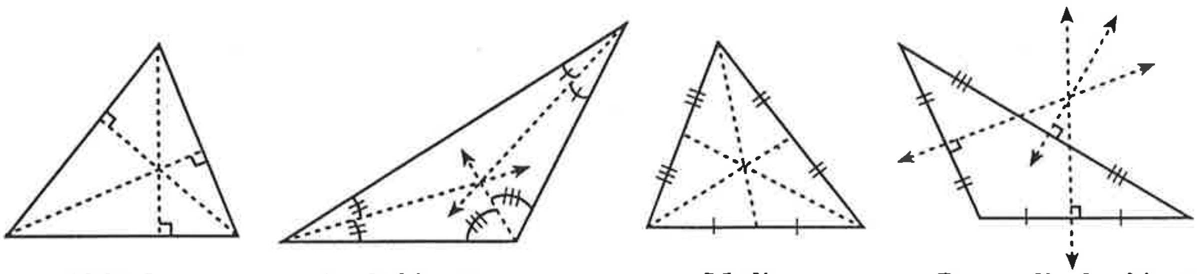
- Every kite has at least two angles of equal measure.

9. Circle terminology.



Circumference – the perimeter of a circle.
Radius – a segment connecting the centre of a circle with a point on the circle.
Diameter – a segment connecting two points on the circle and containing the centre of the circle.
Area – the number of unit squares that can fit inside the circumference of the circle.

10. Definitions – Altitude, angle bisector, median, perpendicular bisector



Altitude – the length of a segment from the vertex perpendicular to the base.
Angle bisector – the ray from the vertex in the interior of an angle that divides the angle into two angles whose values are equal.
Median – the segment connecting a vertex of a triangle to the midpoint of the opposite side.
Perpendicular bisector – the line passing through the midpoint of a segment and perpendicular to the segment.

Triangle Congruency

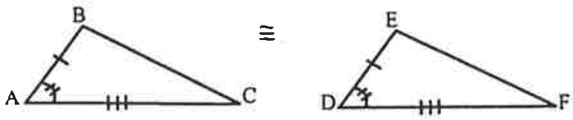
Congruent triangles – triangles that have the same shape and size.

Triangle congruency can be determined in <u>THREE</u> ways:

1) SSS – (side – side – side)

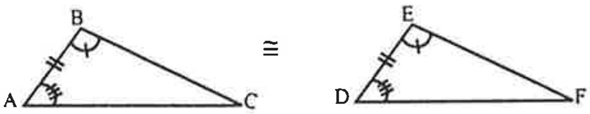
If AB = DE , AC = DF , BC = EF, then $\Delta ABC \cong \Delta DEF$ by SSS
(This is read: ΔABC is congruent to ΔDEF)

2) SAS = (side – angle – side)



If AB = DE , $\angle A = \angle D$, AC = DF, then $\Delta ABC \cong \Delta DEF$ by SAS

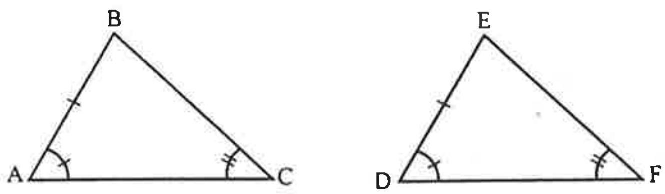
3) ASA – (angle – side – angle)



If $\angle A = \angle D$, AB = DE , $\angle B = \angle E$, then $\Delta ABC \cong \Delta DEF$ by ASA

Are the following pairs of triangles congruent? If congruent, state one of the following congruencies: SSS, SAS, or ASA

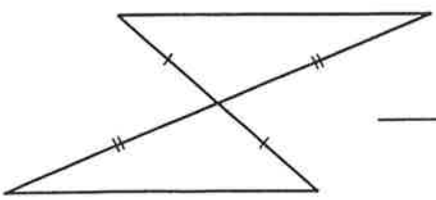
Example:



Since $\angle A \cong \angle D$ and $\angle C \cong \angle F$, we can say $\angle B \cong \angle E$ because if 2 $\angle$'s of a Δ are congruent the third must also be congruent by sum of $\angle$'s in a Δ.

$\therefore \Delta ABC \cong \Delta DEF$ by ASA

1.



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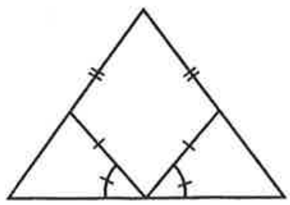
2.



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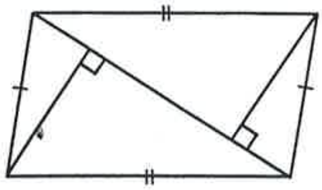
A 3.



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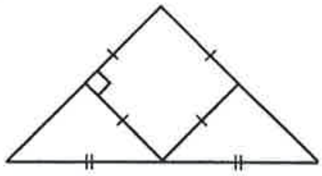
A 4.



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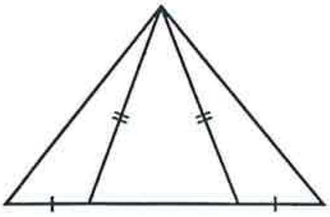
A 5.



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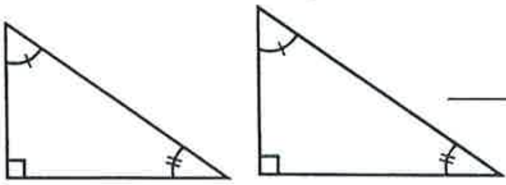
A 6.



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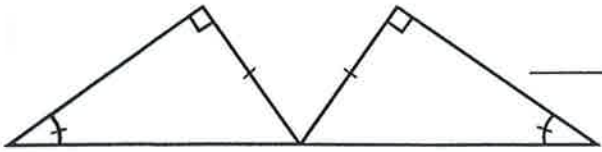

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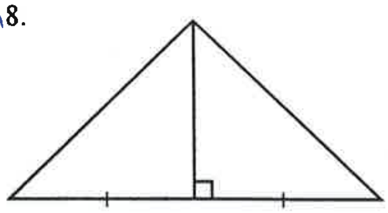
A 8.



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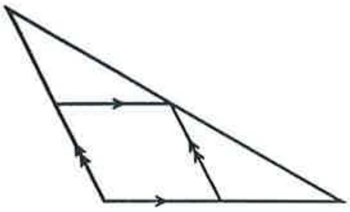
A 9.



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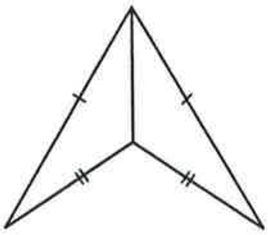
A 10.



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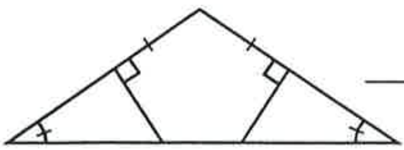
A 11.



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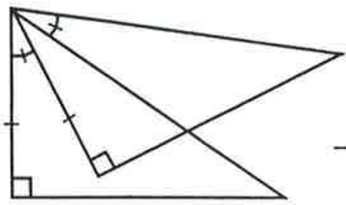
A 12.



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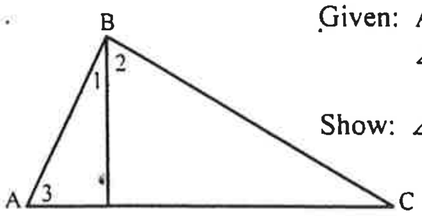
1.



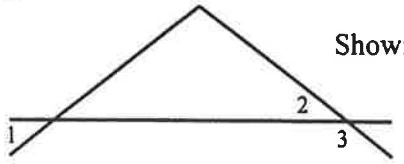
Given: $AB \perp BC$

$\angle 1 + \angle 3 = 90°$

Show: $\angle 3 = \angle 2$

Proof

2.

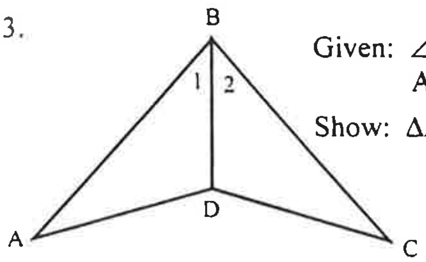


Given: $\angle 1 + \angle 3 = 180°$

Show: $\angle 1 = \angle 2$

Proof

3.



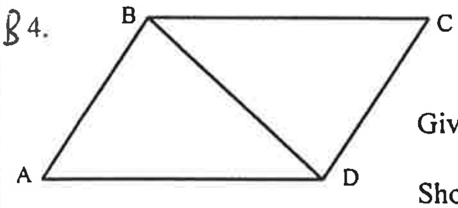
Given: $\angle 1 = \angle 2$

$AB = BC$

Show: $\Delta ABD \cong \Delta CBD$

Proof

4.



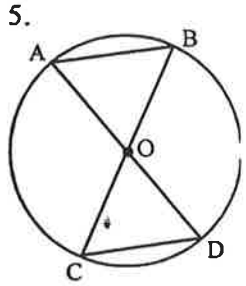
Given: $AB = CD$

$AD = BC$

Show: $\Delta ABD \cong \Delta CDB$

Proof

5.

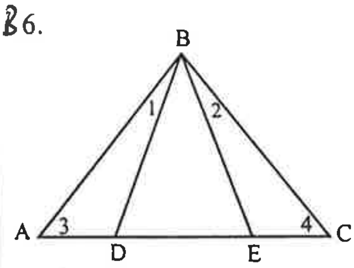


Given: O is the centre of the circle

Show: ΔAOB ≅ ΔCOD

Proof

6.

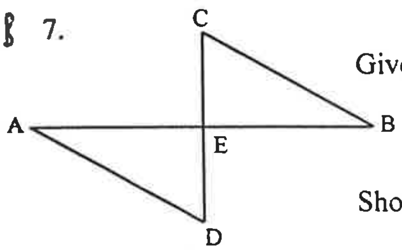


Given: $\angle 1 = \angle 2$
$\angle 3 = \angle 4$

Show: ΔABD ≅ ΔCBE

Proof

7.

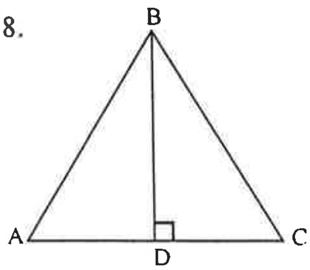


Given: AB ⊥ bisector of CD
CD bisects AB

Show: ΔAED ≅ ΔBEC

Proof

8.

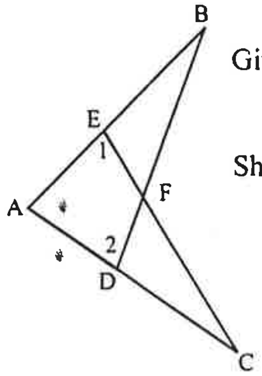


Given: BD ⊥ AC
AB = BC

Show: ΔABD ≅ ΔCBD

Proof

9.

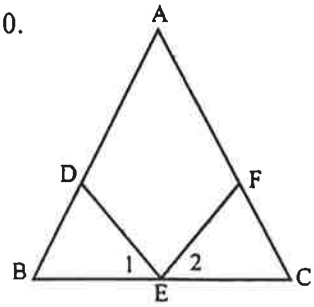


Given: ∠1 = ∠2
EF = DF

Show: ΔEBF ≅ ΔDCF

Proof

10.

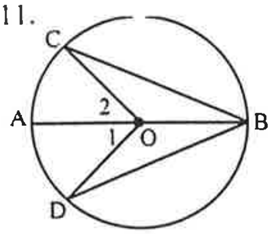


Given: AB = AC
BE = CE
∠1 = ∠2

Show: ΔDBE ≅ ΔFCE

Proof

11.

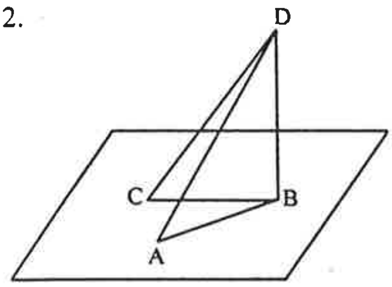


Given: ∠1 = ∠2

Show: ΔOCB ≅ ΔODB

Proof

12.



Given: DB ⊥ AB
DB ⊥ BC
AB = CB

Show: ΔDCB ≅ ΔDAB

Proof

