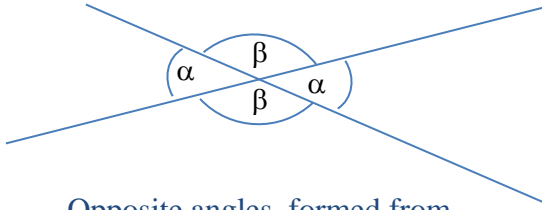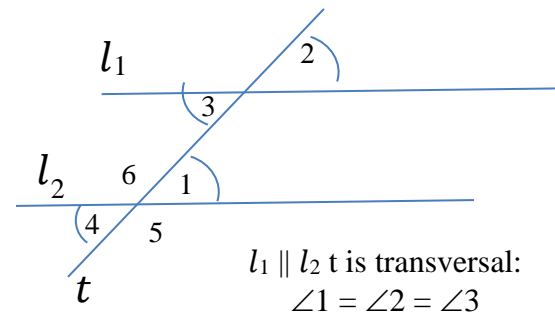Topics: Algebra review. Congruent figures

Two lines with a transverse

Opposite angles, formed from
crossing straight lines, are equal.

$l_1 \parallel l_2$ t is transversal:
$$\angle 1 = \angle 2 = \angle 3$$

$\angle \alpha = \angle \alpha$ – opposite
$\angle \alpha + \angle \beta = 180^0$ – on a straight line,
Or complementary angles

$\angle 1 = \angle 3 =$ alternate interior angles
$\angle 1 = \angle 2 =$ corresponding angles
$\angle 4 = \angle 2 =$ alternate exterior angles
$\angle 5 = \angle 2 =$ same side (consecutive) exterior angles
$\angle 6 = \angle 3 =$ same side (consecutive) exterior angles

Parallelogram: A parallelogram is a quadrilateral in which opposite sides are parallel.
The sum of angles of an n-gon: is (n - 2) × 1800.

Triangle Congruency
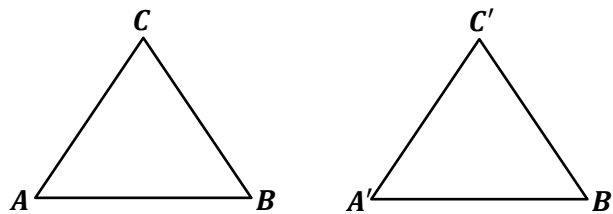
Rule 1 (Axiom 1) SSS rule
The triangles $\varDelta\, ABC \cong \varDelta\, A'B'C'$ are congruent when their sides are equal:
$$AB = A'B' \,, BC = B'C' \,, AC = A'C'$$

Rule 2 (Axiom 1) SAS rule
The triangles $\varDelta\, ABC \cong \varDelta\, A'B'C'$ are congruent when two sides and the angle between them are equal
$$AB = A'B' \,, AC = A'C' \; and \; \angle CAB = \; \angle C'A'B'$$
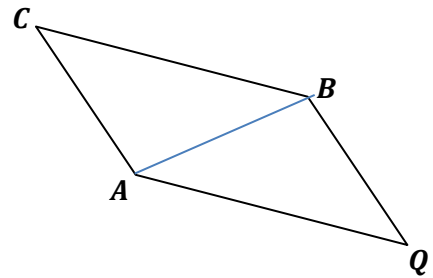
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Problems

1. Simplify the expression in a variable form and find its value if $a = 7\frac{3}{4}$ and $x = -3\frac{2}{3}$

$$-a - b - (a - 5 + x - b) =$$

2. Open brackets and simplify
   a) $(3 - x) + (a + x - 1) - (x - 1) =$
   b) $(a - b) - (6 - b + a) =$
   c) $-(9 + a) + (a - b) - (6 - a - b) =$
   d) $3(5x - 2) - (2x + 3) =$
   e) $6 \cdot (3x + 2) - (10b + 8x) =$

3. In the quadrilateral AQBC, AC = BC and CB = AQ. Prove that
   a) $\triangle ACB \cong \triangle ABQ$
   b) AQBC is a parallelogram

4. One of the acute angles in a right triangle is 45°. Prove that this triangle is an isosceles.

5. Find the angles in an equilateral triangle.

6. Two triangles have equal angles. Are these triangles congruent?

7. ABCD is a rhombus, a quadrilateral with all sides equal (not a square). Point M is an intersection point of the diagonals AC and BD. Show that

   a) $\triangle ABC \cong \triangle ADC$
   b) $\triangle AMB \cong \triangle AMD$
   c) The diagonals are perpendicular to each other.
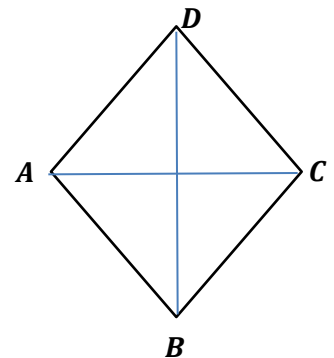
8 . List the properties of an isosceles triangle
   a) Draw and label the triangle
   b) Add the median – label opropreatly
   c) List all sides and angles that are equal