

MPM 1DI Unit 6

Geometric Relationships

7.1 Angle Relationships in Triangles

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Polygon: A closed figure made up of line segments.

Vertex: The point where two or more sides meet.

Interior Angle: Angle formed on the inside of a polygon by two sides meeting at a vertex.

Exterior angle : Angle formed on the outside of a geometric shape by extending one of the sides past a vertex

Supplementary Angles: Angles that sum to 180° are supplementary (S.A.T.)

Complementary Angles: Angles that sum to 90° are complementary. (C.A.T.)

CONSTRUCTING TRIANGLES

1. Draw a large Triangle and Label the first vertex A, the second B and the third C.
2. Measure each of the interior angles and label them on your diagram.
3. Calculate the sum of the interior angles.
4. At each vertex extend one side of the triangle to form an exterior angle.
5. Record the measure of the exterior angles on the board.
6. Measure each of these angles and record them on your diagram. Calculate the sum of the exterior angles.
7. Compare the measurement of the exterior angle with the sum of the two interior angles at the other two vertices.

Triangle.gsp



Untitled.gsp

Angle Relationships :

1. **Polygon Exterior Angle Sum Theorem (PEAST)**

The sum of the exterior angles in a triangle is 360° .

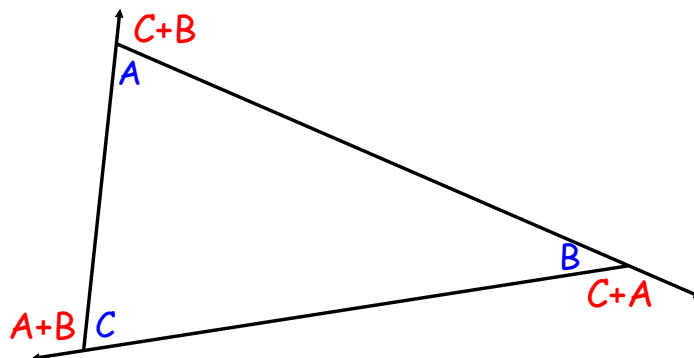
2. **Exterior Angle Theorem (EAT)**

The exterior angle at each vertex of a triangle is equal to the sum of the interior angles at the other two vertices.

Interior Angle Relationship:

Angle Sum Triangle Theorem (ASTT) :

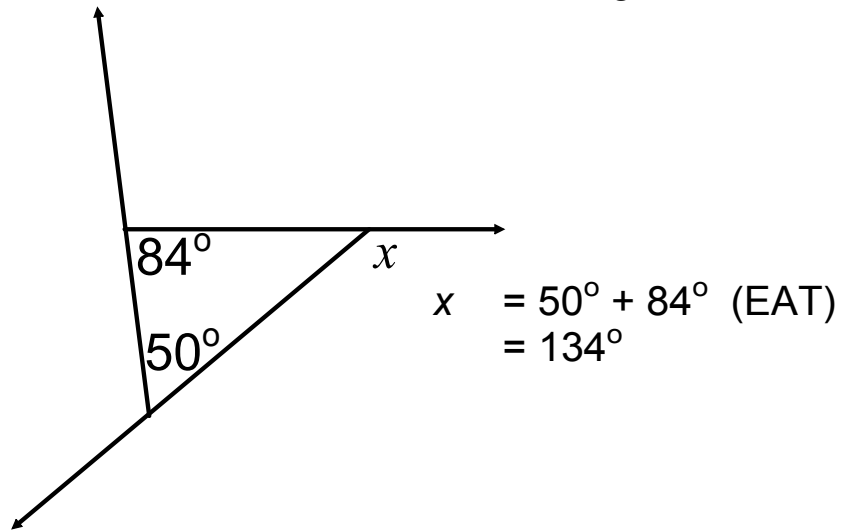
The sum of the angles in a triangle is 180° .



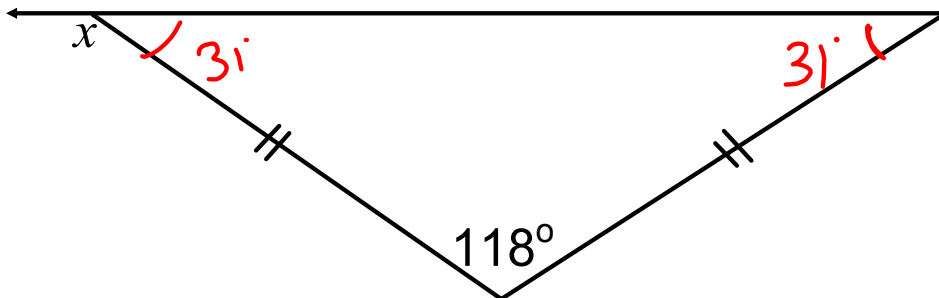
Examples:

1. Find the measure of the unknown angle:

a)



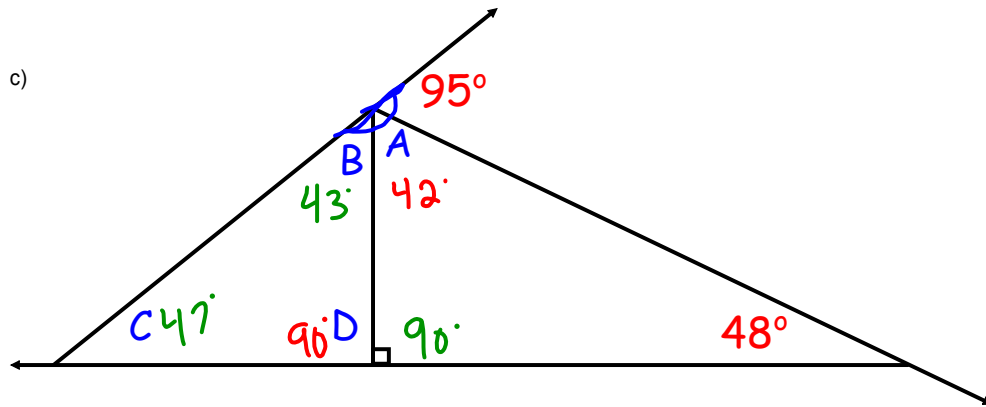
b)



Since the triangle is isosceles,
the remaining two angles are
equal (ITT)

$$\begin{aligned} \text{Interior Angles} &= (180^\circ - 118^\circ) \div 2 \text{ (ITT, ASTT)} \\ &= 62^\circ \div 2 \\ &= 31^\circ \end{aligned}$$

$$\begin{aligned} \text{Exterior Angle } x &= 180^\circ - 31^\circ \text{ (SAT)} \\ &= 149^\circ \end{aligned}$$



$$\text{Angle A} = 180 - 90 - 48 \quad (\text{interior angles of triangle or ASTT}) \\ = 42^\circ$$

$$\text{Angle B} = 180 - 95 - 42 \quad (\text{SAT}) \\ = 43^\circ$$

$$\text{Angle D} = 90^\circ \quad (\text{SAT})$$

$$\text{Angle C} = 180 - 43 - 90 \quad (\text{interior angles of a triangle - ASTT}) \\ = 47^\circ$$

Assigned Work

Pg 371 # 1 – 9, 11, 14

Attachments

Triangle.gsp

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