U7D1_T Angle relationships in Triangles

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Angle rela...

U7D1 MPM 1DI Geometric Relationships

7.1 Angle Relationships in Triangles

Polygon: A closed 2-dimentional figure made up of line segments.

Vertex: The point where two or more sides meet.

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

Exterior angle: An angle formed on the outside of a geometric shape by extending one of the sides past a vertex. (The exterior angle and the interior angle together form a straight angle i.e., they are "supplementary")

Supplementary Angles: TWO angles that sum to 180° are supplementary (abbreviated: SA or supp)

Complementary Angles: TWO angles that sum to 90° are complementary (CA or comp)

Constructing a Triangle (google geogebra … choose www.geogebra.org/apps/ then choose geometry

Exterior Angle Relationships:

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

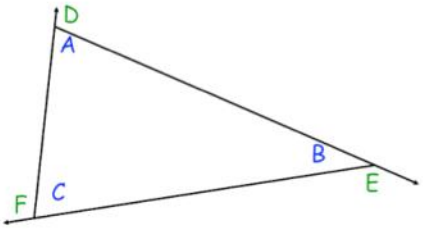
The sum of the exterior angles in a triangle is 360°.

D + E + F = 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.

D = C + B **E = A + C** **F = A + B**



NOTE: $A+B+C=180°$ (ASTT)
$A+D=180°$ (SA)

So, $A+B+C=A+D$

$\boxed{B+C=D}$

subtract A from both sides

Interior Angle Relationships:

Angle Sum Triangle Theorem (ASTT)

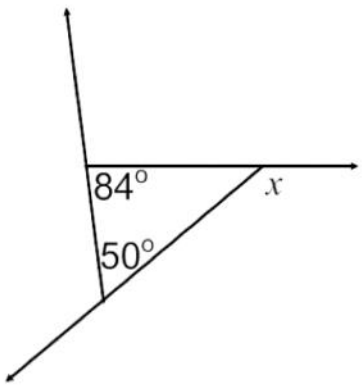
The sum of the interior angles of a triangle is 180°.

A + B + C = 180°

Examples:

1. Find the measure of the unknown angle:

a)

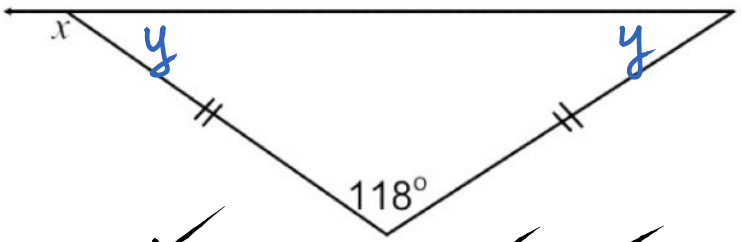


$x = 84° + 50°$ (EAT)

$x = 134°$

b)

Isosceles Triangle Theorem (ITT)



$2y + 118° = 180°$ (ITT, ASTT)

$2y = 62°$

$y = 31°$

$x = 118° + 31°$ (EAT)

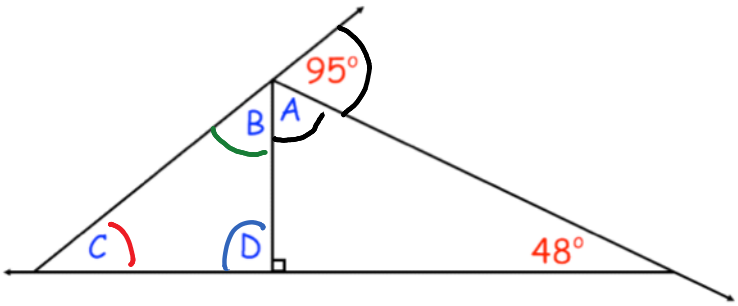
$x = 149°$

OR

$x = 180° - 31°$ (SA)

$x = 149°$

c)



Angle A = $180° - 90° - 48°$
$= 42°$ (ASTT)

Angle B = $180° - 95° - 42°$ (SA)
$= 43°$

Angle C = $95° - 48°$ (EAT)
$= 47°$

Angle D = $90°$ (SA)

OR

$C = 180° - 43° - 90°$ (ASTT)
$C = 47°$

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