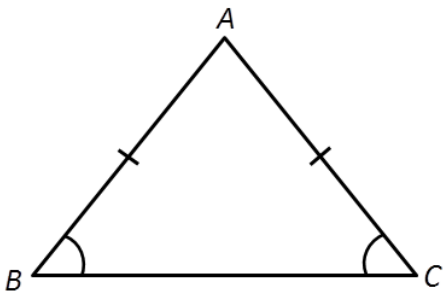
Answer on Question # 70897 – Math – Geometry

Question

In the diagram below of ΔABC, AB ≅ AC, m∠A = 3x , and m∠B = x + 20. What is the value of x?

Solution

The triangle ΔABC is shown in the diagram below. If $AB \cong AC$ then ΔABC is isosceles with legs AB and AC, base BC, vertex A, vertex angle A, and base angles at B and C.



Use the theorem: If two sides of a triangle are congruent, $AB \cong AC$, then the angles opposite these sides are also congruent, that is, $\angle C \cong \angle B$. Hence

$$m\angle C = m\angle B = x + 20.$$

Now we use the theorem: In a triangle, the sum of the measures of the interior angles is 180°, that is,

$$\boldsymbol{m\angle A + m\angle B + m\angle C = 180^0}\ .$$

Substituting values $m\angle A = 3x$, $m\angle B = m\angle C = x + 20$ we get the equation with respect to x:

$$3x + x + 20 + x + 20 = 180$$

Solving this equation

$$5x + 40 = 180$$

$$5x = 180 - 40$$

$$5x = 140$$

$$x = \frac{140}{5}$$

$$x = 28$$

Answer: $x = 28$.