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Mathematics Grade 6 Geometry
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P1. Height And Median In An Isosceles Triangle

Problem. Consider isosceles triangle $\triangle ABC$ ($AB \cong AC$) and M the middle of BC as shown in Fig. 1. Prove that $AM \perp BC$.

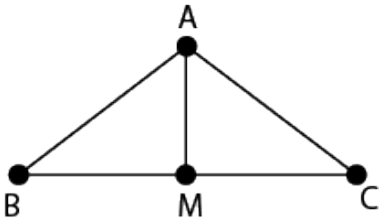

FIGURE 1. Isosceles triangle and median.

Proof:

The symbol $\cong$ means congruence that is same shape (measures) but not equality. Equality means the same sets of points.

$AM \perp BC$ means the measure of angle $\angle AMB$ is equal to the measure of angle $\angle AMC$ is equal to 90°.

The proof is based on the primary observation that triangles $\triangle BAM$ and $\triangle CAM$ are congruent.

We have $AB \cong AC$ and $BM \cong MC$. The case of congruence observed is side-side-side.

From the congruence of the triangles mentioned before we observe the congruence of the angles $\angle BMA$ and $\angle AMC$.

The sum of (the measures of) these two congruent angles is 180°. We deduce each of them has a measure of 90°.

We conclude: $AM \perp BC$.

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