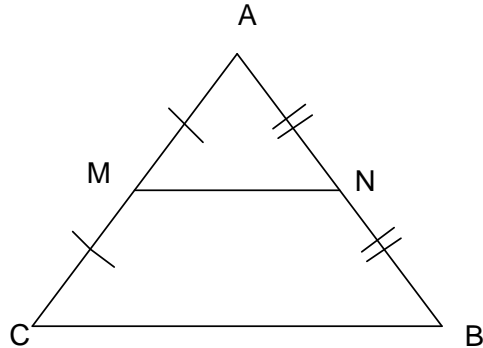


If a line segment joins the midpoints of two of the sides of a triangle then it is parallel to the third side? This has to do with isosceles triangles and coordinate proofs.



Given:

$$AM = MC, AN = NB, \text{ so } AC = 2AM, AB = 2AN$$

In the triangles ABC and ANM:

$$\angle CAB = \angle MAN \text{ (common)}$$

$AC = 2AM, AB = 2AN$  (given), so  $\triangle ABC$  and  $\triangle ANM$  are similar (SAS – two sides of one triangle are respectively proportional to the two sides of another triangle, and the included angles are equal).

Hence the matching angles of the triangles have the same size  $\angle AMN = \angle ACB$

$\angle AMN$  and  $\angle ACB$  are corresponding angles of MN and CB. If any pair of corresponding angles are equal, then the lines are parallel.

Hence  $MN \parallel CB$ .