

MT 453 Elements

Speaker: Matthew MacDonald

Scribe: Dan Moresco

Artist: Thomas Quan

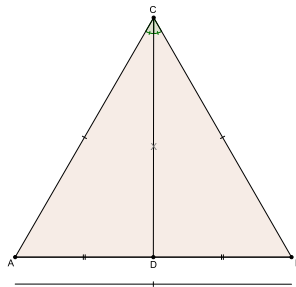
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Proposition I.10

How to bisect a straight line.

Let AB be the given line.

Construct equilateral triangle ABC. [Proposition I.1]



Bisect $\angle ACB$ with the line CD, where the point D is on the line AB. [Proposition I.9]

Claim: line AB has been bisected.

$\angle ACD = \angle BCD$ because $\angle ACB$ was bisected and $AC = BC$ because triangle ACB is equilateral.

We also know that side CD is common.

Therefore triangles ACD and BCD are congruent. [Proposition I.4]

Therefore $AD = BD$ [Proposition I.4] and so the line AB has been bisected.

QEF

Comments:

- To cut a line into four pieces, first bisect the line and then bisect the two halves of the original line.
- To cut a line into three pieces, a more complicated process is needed that involves the use of similar triangles or other methods of proof.