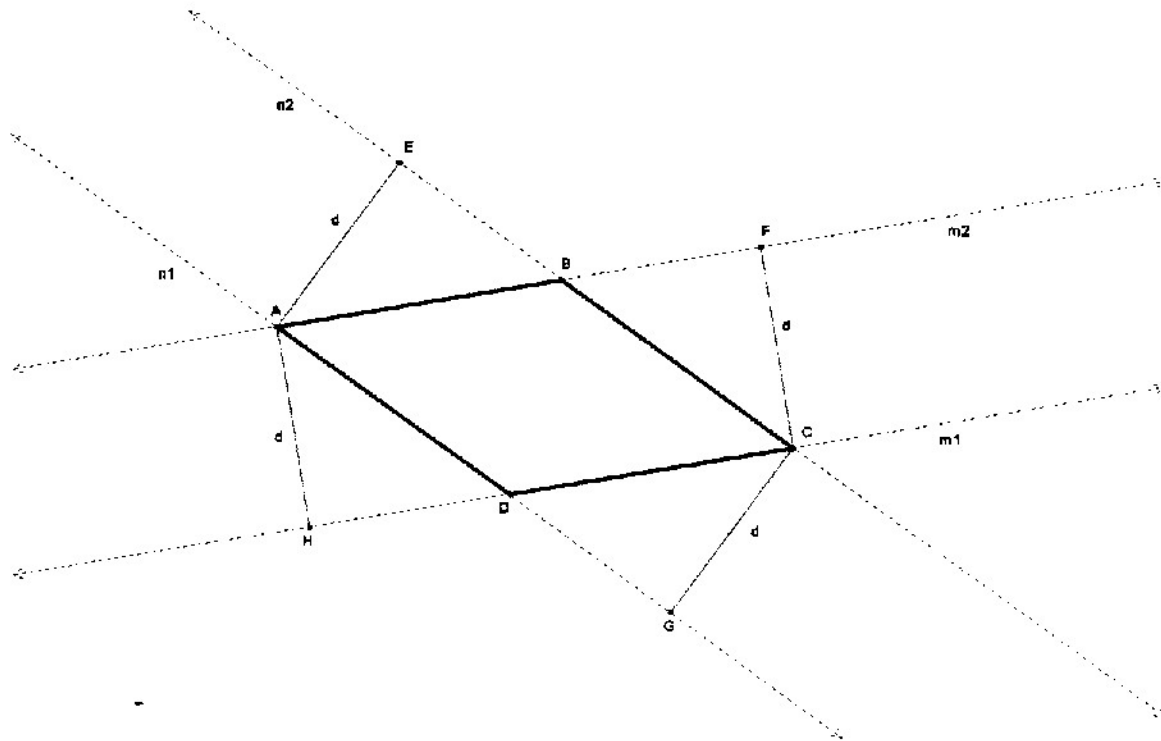


#### 4.6 Two-edged ruler figure (6 points)

Suppose you place your ruler on paper and without moving it, draw lines along both edges of the ruler. Then turn the ruler (no special angle) and draw lines along both edges again.

Prove that the quadrilateral formed by the 4 lines is a rhombus.

More formally, there are given two parallel lines  $m_1$  and  $m_2$  which are distance  $d$  apart. Let  $n_1$  and  $n_2$  be another pair of parallel lines that are the same distance  $d$  apart, but which are not parallel to the first pair. Then the lines will intersect at four points, forming a parallelogram (by definition!). Prove that this parallelogram is a rhombus.



We are given:

$\angle EBA = \angle FBC$  because they are vertical angles

$\angle GDC = \angle HAD$  because they are vertical angles

$\angle BEA = \angle BFC = \angle DGC = \angle DHA = 90$

$n_1 \parallel n_2$  and  $m_1 \parallel m_2$

$\triangle BEA = \triangle BFC = \triangle DGC = \triangle DHA$ , by AAS.

Therefore, corresponding sides are equal.

So  $AB = BC = CD = DA$

*Therefore, ABCD is a rhombus*