Condition for parallelogram

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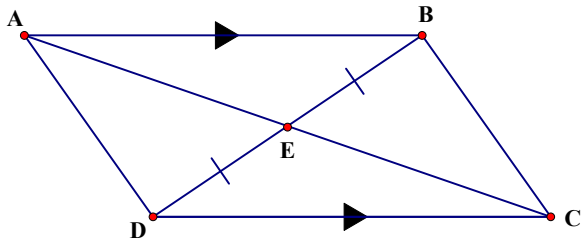
Given a quadrilateral $ABCD$. The diagonals AC and BD intersect at E.



If $BE = DE$ and $AB \parallel DC$,

then $ABCD$ is a parallelogram.

Proof: $\angle ABE = \angle CDE$ (alt. $\angle$s, $AB \parallel DC$)

$\angle AEB = \angle CED$ (vert. opp. $\angle$s)

$BE = DE$ (given)

$\Delta AEB \cong \Delta CED$ (A.S.A.)

$AE = CE$ (corr. sides, $\cong \Delta$s)

$ABCD$ is a parallelogram (diags. bisect each other)

The proof is completed.