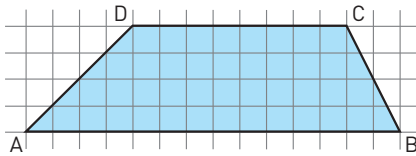> **YOU & MATHS** **Isosceles transformation** Given a trapezium, transform it into an isosceles trapezium that has the same area.
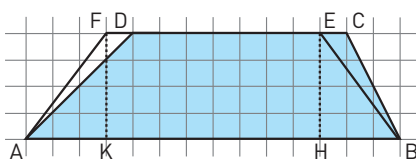
Let us draw a trapezium *ABCD*.

Then let us find two points, *E* and *F*, on the line *CD* so that *ABEF* is an isosceles trapezium equivalent to *ABCD*.

Let *H* be the perpendicular projection of point *E* on line *AB*, and let *K* be the projection of *F* on the same line. We choose *E* and *F* so that:

$$EF \cong CD \text{ and } AK \cong HB.$$

Then the trapezium *ABEF* is:

- isosceles because $AF \cong BE$, since the right triangles *AKF* and *BHE* are congruent by construction;
- equivalent to *ABCD*, since one of the parallel sides, *AB*, is common to both polygons, the other parallel sides, *CD* and *EF*, are congruent by construction and the altitude is the same.