TESTS FOR QUADRILATERALS – WORKED EXAMPLE

COURSE/LEVEL

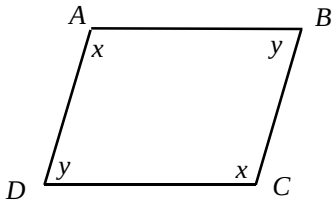
NSW Secondary High School Year 11 Preliminary Mathematics.

TOPIC

Plane Geometry: Tests for Quadrilaterals. (Syllabus Ref: 2.2)

Example

Prove that a quadrilateral is a parallelogram if both pairs of opposite angles are equal.

Steps to follow	Solution
1. Draw diagram of quadrilateral with opposite angles equal.	
2. State what is given in the problem and the aim of the problem.	Given: Quadrilateral $ABCD$ in which $\angle A = \angle C$ and $\angle B = \angle D$. Aim: To prove that $AD \parallel BC$ and $AB \parallel DC$
3. Prove the result	Let $x = \angle A = \angle C$ and $y = \angle B = \angle D$ $x + y + x + y = 360^0$ (angle sum of quadrilateral) $2x + 2y = 360^0$ $2(x + y) = 360^0$ Therefore, $x + y = 180^0$ That is, $\angle A + \angle B = 180^0$ and $\angle A + \angle D = 180^0$ Therefore, $AD \parallel BC$ (cointerior angles are supplementary) and $AB \parallel DC$ (cointerior angles are supplementary)
4. State conclusion	Thus, the quadrilateral is a parallelogram as both pairs of opposite sides are parallel.