

TESTS FOR QUADRILATERALS – WORKSHEET

COURSE/LEVEL

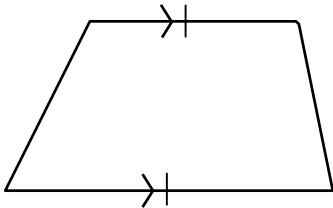
NSW Secondary High School Year 11 Preliminary Mathematics.

TOPIC

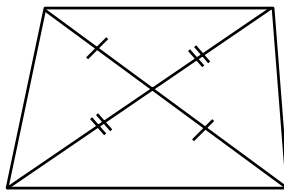
Plane Geometry: Tests for Quadrilaterals. (Syllabus Ref: 2.2)

1. Identify the type of quadrilaterals drawn below and state the test used. (Ignore the shape of the drawings.)

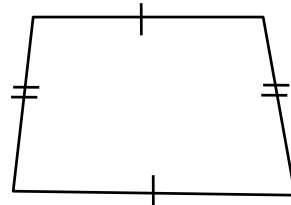
(a)



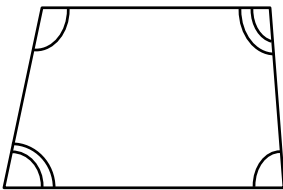
(b)



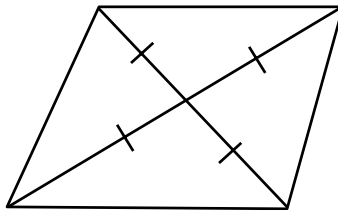
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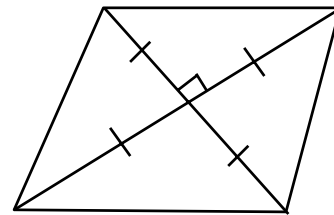
(d)



(e)



(f)



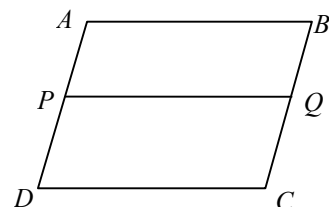
2. Draw diagrams to disprove the following statements that a quadrilateral is a parallelogram if

- (i) one pair of sides are parallel
- (ii) one pair of opposite sides are equal
- (iii) two pairs of sides are equal

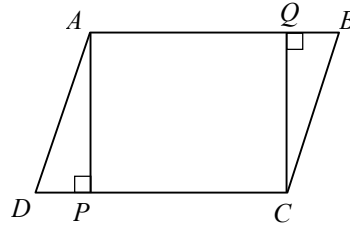
3. Provide a counterexample to disprove the following. (A counterexample is an example that disproves a general statement.)

- (i) A quadrilateral is a rhombus if each diagonal bisects the vertex angles through which it passes.
- (ii) A parallelogram is a square if the diagonals bisect each other at right angles.
- (iii) A quadrilateral is a parallelogram if a pair of cointerior angles are supplementary.

4. $ABCD$ is a parallelogram. P is the midpoint of AD , Q is the midpoint of BC . Show that $ABQP$ is a parallelogram.

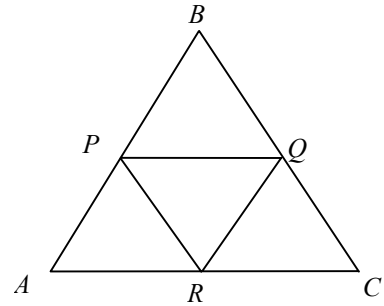


5. $ABCD$ is a parallelogram.
 $\angle APD = 90^\circ$ and $\angle CQB = 90^\circ$.
 Show that $AQCP$ is a rectangle.

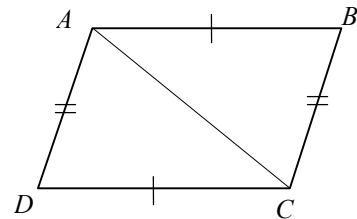


6. $\triangle ABC$ is an equilateral triangle. P , Q and R are midpoints of sides AB , BC and CA respectively.

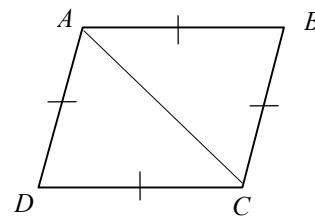
- (i) Show that $\triangle PQR$ is an equilateral triangle.
 (ii) How many parallelograms are there in this figure?
 (iii) Show that each parallelogram is a rhombus.



7. Use the above diagram to prove that a quadrilateral is a parallelogram if both pairs of opposite sides are equal.
 (Hint: first prove that $\triangle ABC \cong \triangle ADC$. Then show that alternate angles are equal.)



8. Use the above diagram to prove that a quadrilateral is a rhombus if all sides are equal. (You need to prove that the quadrilateral $ABCD$, which has four equal sides, is a parallelogram.)



9. Draw a quadrilateral and join the midpoints of the adjacent sides.
- (a) What figure results when the quadrilateral is
- a square?
 - a rectangle?
 - a rhombus?
 - a parallelogram?
- (b) What general statement can you make that applies to the figure formed by joining the midpoints of any quadrilateral? Try to prove this for any quadrilateral.