

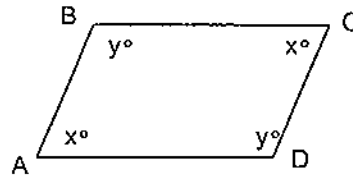
1. What are the FIVE ways to prove that a quadrilateral is a parallelogram?

- a. Show BOTH pair of opp sides \parallel
- b. Show BOTH pair of opp sides \cong
- c. Show BOTH pair of opp \angle 's \cong
- d. Show ONE pair of opp sides \cong AND \parallel
- e. Show that diagonals bisect each other

2. Prove that if both pairs of opposite angles of a quadrilateral are congruent, then the quadrilateral is a parallelogram.

Given: $m\angle A = m\angle C = x$
 $m\angle B = m\angle D = y$

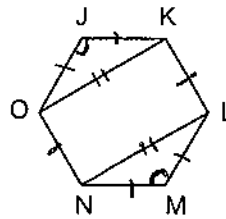
Prove: $ABCD$ is a parallelogram



Statements	Reasons
1. $m\angle A = m\angle C = x$; $m\angle B = m\angle D = y$	1. Given
2. $2x + 2y = 360$	2. 360° in a quad.
3. $x + y = 180$	3. Division
4. $\overline{AB} \parallel \overline{DC}$; $\overline{AD} \parallel \overline{BC}$	4. Consec. Int \angle 's Thm Converse
5. $ABCD$ is a parallelogram	5. Def of \square

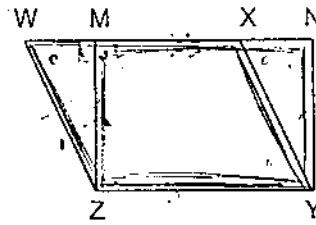
3. Given: Regular hexagon $JKLMNO$

Prove: $OKLN$ is a parallelogram



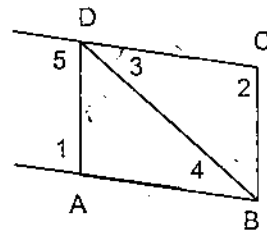
Statements	Reasons
1. Reg hexagon $JKLMNO$	1. Given
2. $\overline{JO} \cong \overline{NM}$; $\overline{JK} \cong \overline{ML}$; $\angle J \cong \angle M$	2. Def of Reg. Fig.
3. $\triangle OJK \cong \triangle NML$	3. SAS \cong Postulate
4. $\overline{OK} \cong \overline{NL}$	4. CPCTC
5. $\overline{ON} \cong \overline{KL}$	5. Definition of regular polygon
6. $OKLN$ is a parallelogram	6. If BOTH pair of opp sides \cong , then \parallel -gram

4. Given: $\square WXYZ$;
 $\overline{MZ} \perp \overline{WN}$; $\overline{NY} \perp \overline{WN}$
 Prove: $\square MNYZ$ is a parallelogram



Statements	Reasons
1. $\square WXYZ$, $\overline{MZ} \perp \overline{WN}$, $\overline{NY} \perp \overline{WN}$	1. Given
2. $\overline{MZ} \parallel \overline{NY}$	(Perp. to a Trans. Thm) 2. \square lines \perp to same line are \parallel
3. $\overleftrightarrow{WN} \parallel \overleftrightarrow{ZY}$	3. Def \square
4. $MNYZ$ is \square	4. Def \square

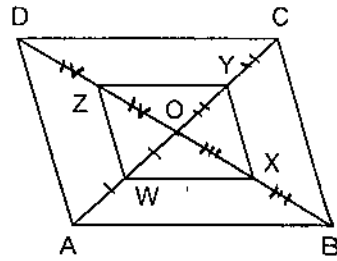
5. Given: $\angle 1$ is supp. to $\angle 2$
 $\angle 3 \cong \angle 4$
 Prove: $ABCD$ is a parallelogram



Statements	Reasons
1. $\angle 1$ supp to $\angle 2$; $\angle 3 \cong \angle 4$	1. Given
2. $\angle 1$ supp to $\angle 6$	2. Linear Pair Post
3. $\angle 2 \cong \angle 6$	3. \cong supp thm
4. $\overline{DB} \cong \overline{DB}$	4. Refl. Prop
5. $\triangle ABD \cong \triangle CDB$	5. AAS
6. $\overline{DC} \cong \overline{AB}$, $\overline{AD} \cong \overline{BC}$	6. CPCTC
7. $ABCD$ is \square	7. If both pair of opp sides \cong , then \square

6. Given: $\square ABCD$; W, X, Y, Z are midpoints of $\overline{AO}, \overline{BO}, \overline{CO}, \overline{DO}$

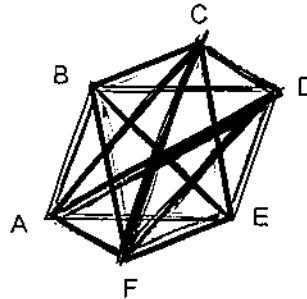
Prove: $WXYZ$ is a parallelogram



Statements	Reasons
1. $\square ABCD$; W, X, Y, Z are mdpts	1. Given
2. $AO = OC$; $DO = OB$	2. Diag's of \square bisect each other
3. $OW = \frac{1}{2} AO$, $OY = \frac{1}{2} OC$ $OX = \frac{1}{2} OB$, $OZ = \frac{1}{2} OD$	3. Midpt Thm
4. $OW = \frac{1}{2} OC$; $OX = \frac{1}{2} OD$	4. Subst (2+3)
5. $OW = OY$; $OX = OZ$	5. Subst (3+4)
6. $WXYZ$ is a \square	6. If diagonals bisect each other, then \square

7. Write a paragraph proof. (Hint: a short proof is possible if certain auxiliary segments are drawn.)

Given: $\square ABDE$; $\square BCEF$
 $\square ABCD$; $\square BEDF$
 Prove: $AECF$ is a parallelogram
 $ACDF$



AD bisects BE

CF bisects BE

