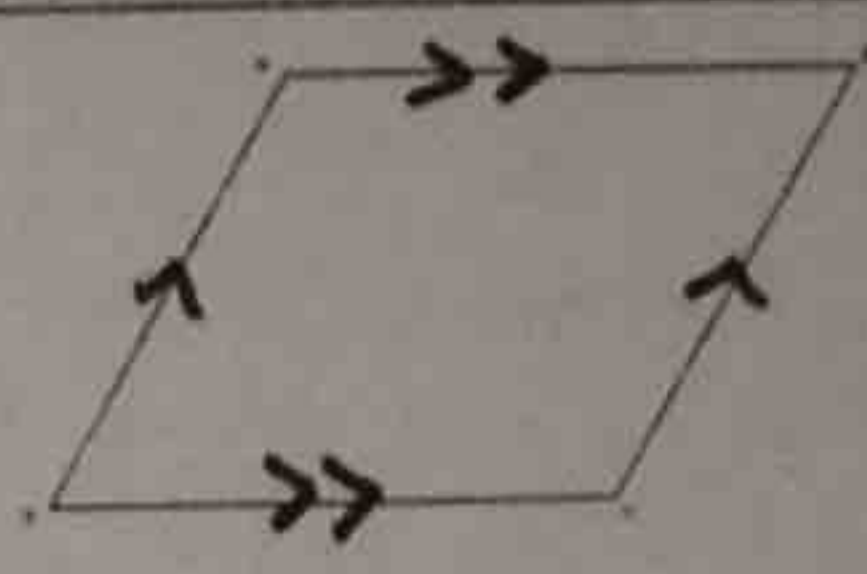
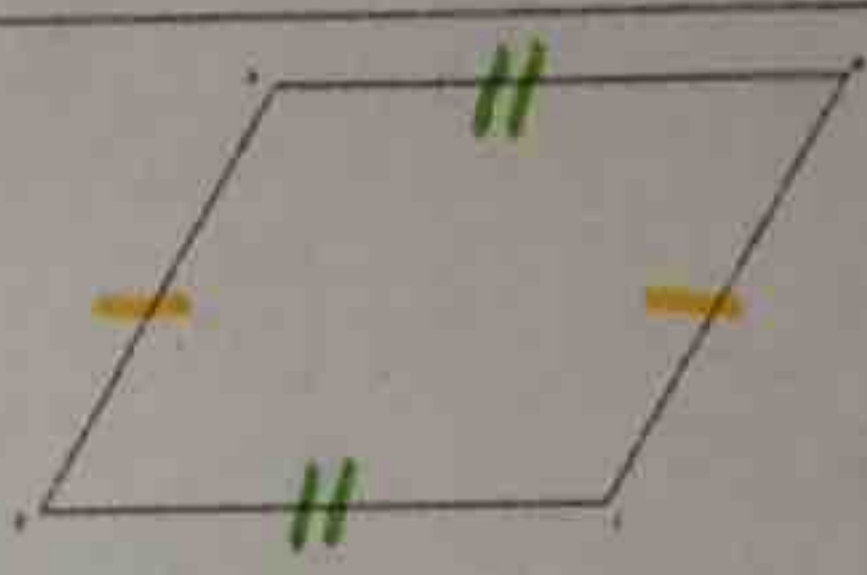
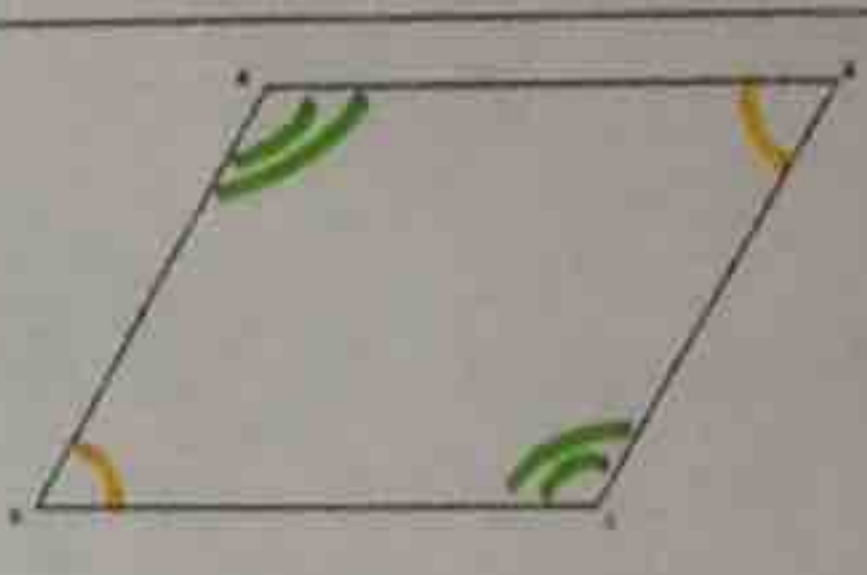
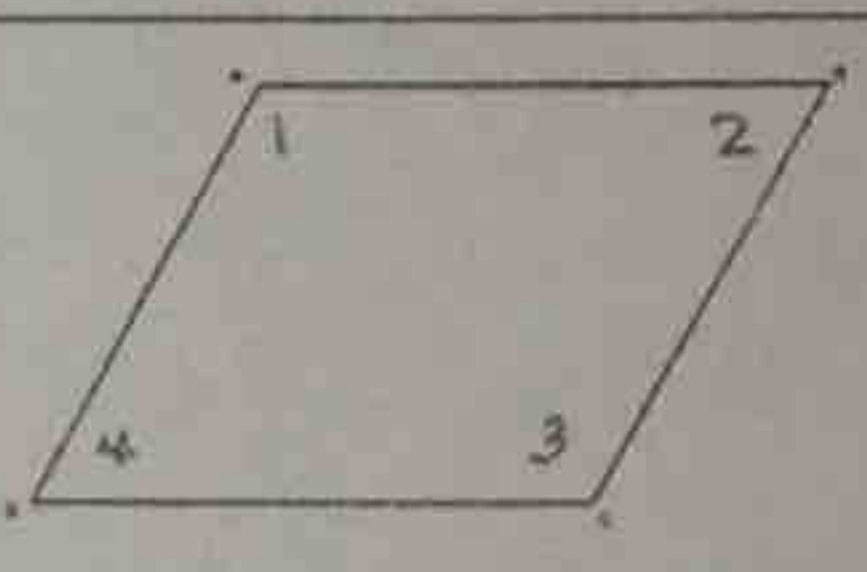
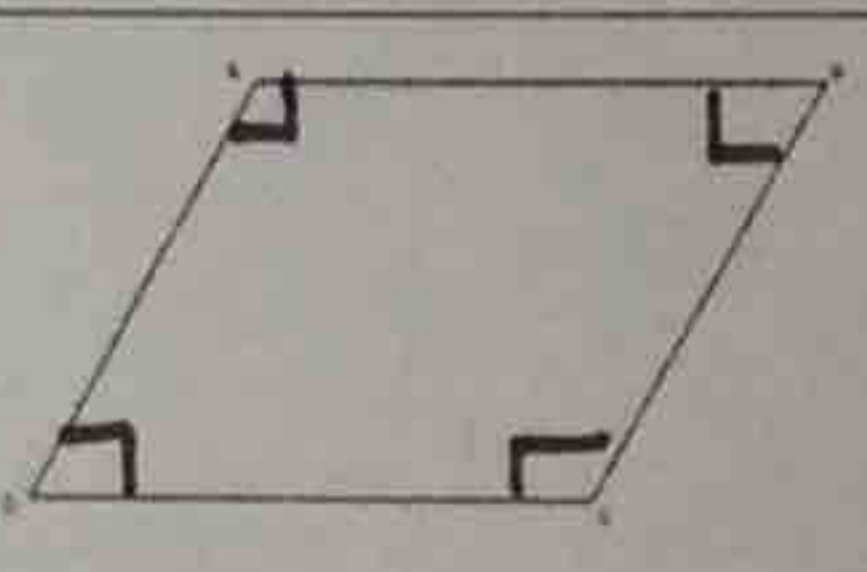
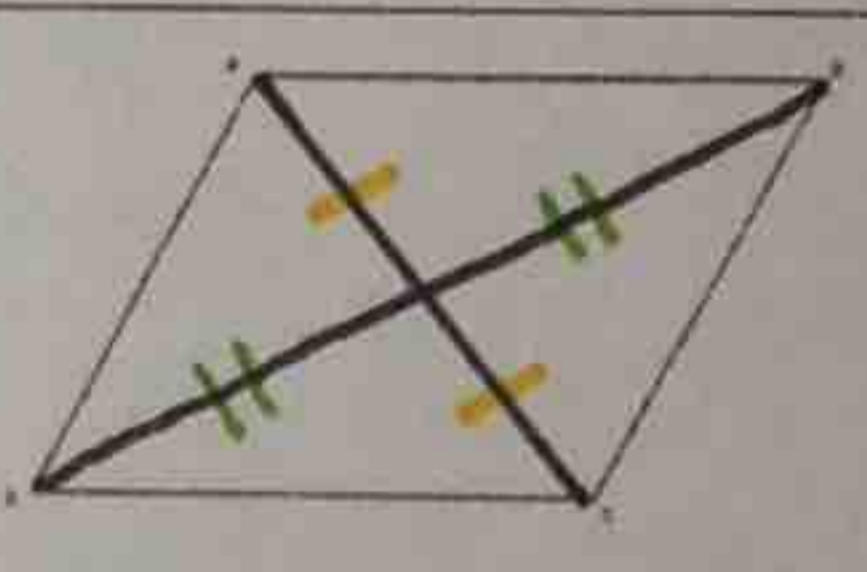
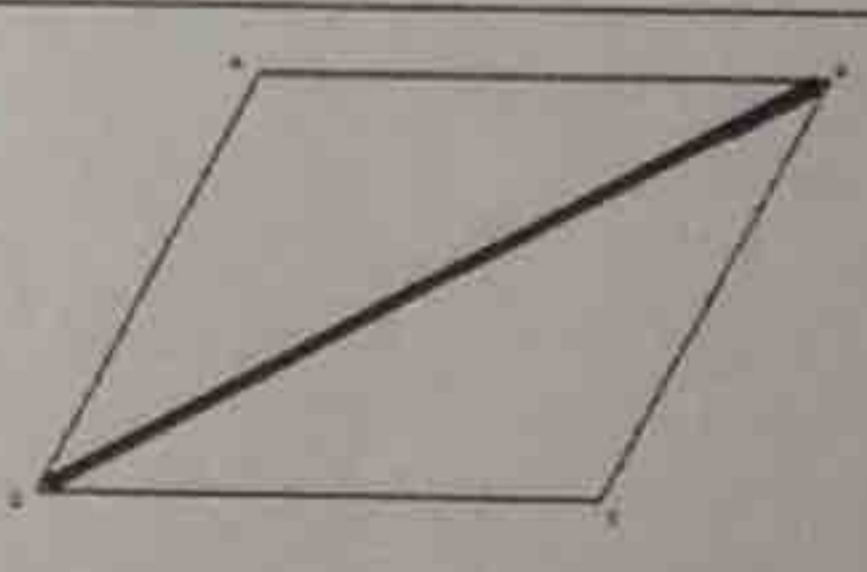


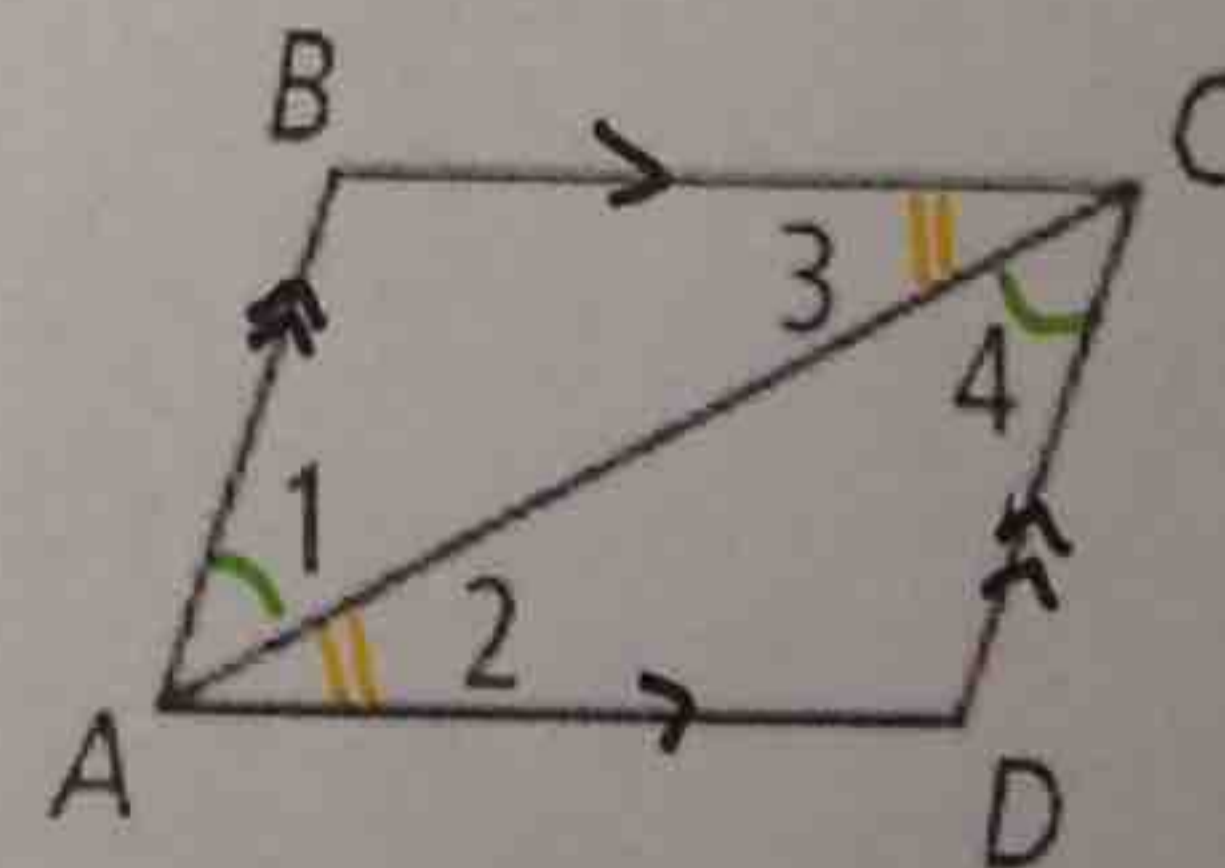
SWBAT prove a figure to be a parallelogram and solve for variables in a parallelogram.

Properties of Parallelograms

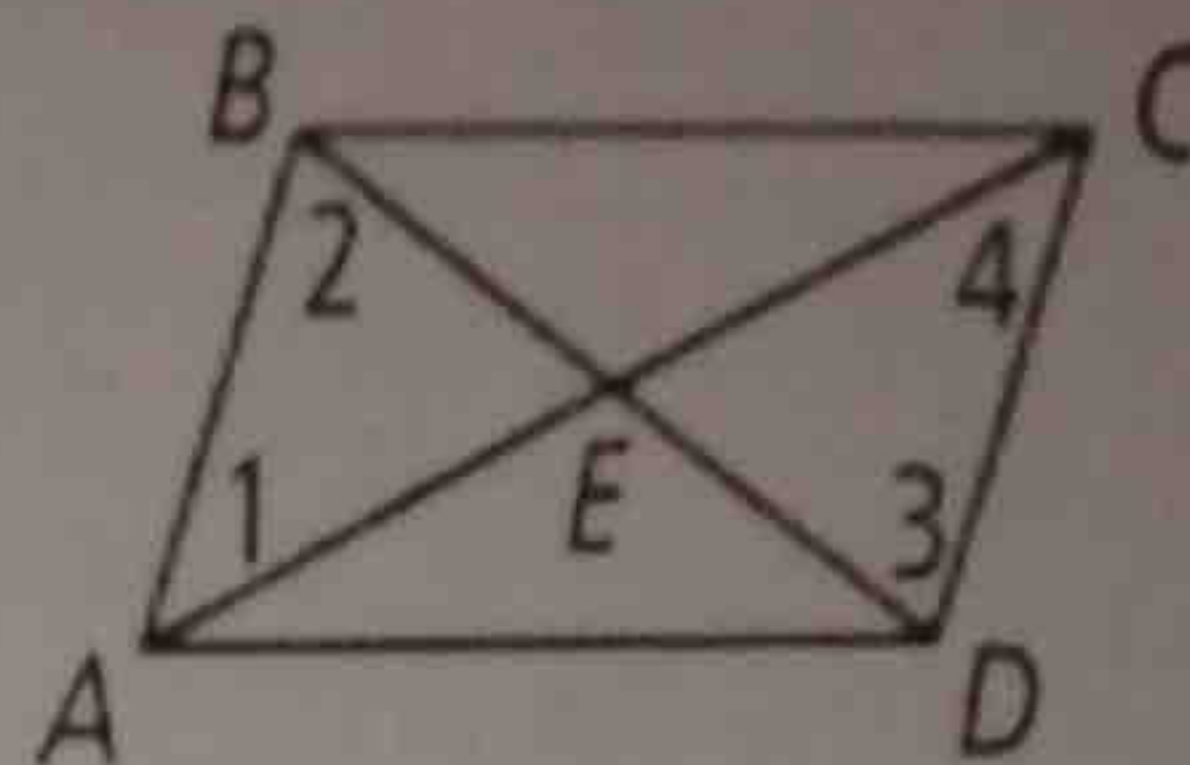
Sides	A parallelogram is a quadrilateral with both pairs of opposite sides parallel.	
	If a quadrilateral is a parallelogram, the 2 pairs of opposite sides are congruent.	
Angles	If a quadrilateral is a parallelogram, the 2 pairs of opposite angles are congruent.	
	If a quadrilateral is a parallelogram, the consecutive angles are supplementary. $\angle 1 + \angle 2 = 180$ $\angle 2 + \angle 3 = 180$ $\angle 3 + \angle 4 = 180$ $\angle 4 + \angle 1 = 180$	
	If a quadrilateral is a parallelogram and one angle is a right angle, then all angles are right angles.	
Diagonals	If a quadrilateral is a parallelogram, the diagonals bisect each other.	
	If a quadrilateral is a parallelogram, the diagonals form two congruent triangles.	

Example 1: Given: $\square ABCD$ is a parallelogram.
Prove: $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{DA}$.

Statement	Reason
1. $ABCD$ is a parallelogram	1. Given
2. $\overline{AB} \parallel \overline{CD}$, $\overline{BC} \parallel \overline{AD}$	2. Definition of a parallelogram
3. $\angle 1 \cong \angle 4$, $\angle 3 \cong \angle 2$	3. Alt. int. $\angle s \cong$
4. $\overline{AC} \cong \overline{AC}$	4. reflexive prop.
5. $\triangle ABC \cong \triangle CDA$	5. ASA $\triangle \cong$
6. $\overline{AB} \cong \overline{CD}$, $\overline{BC} \cong \overline{DA}$	6. CPCTC

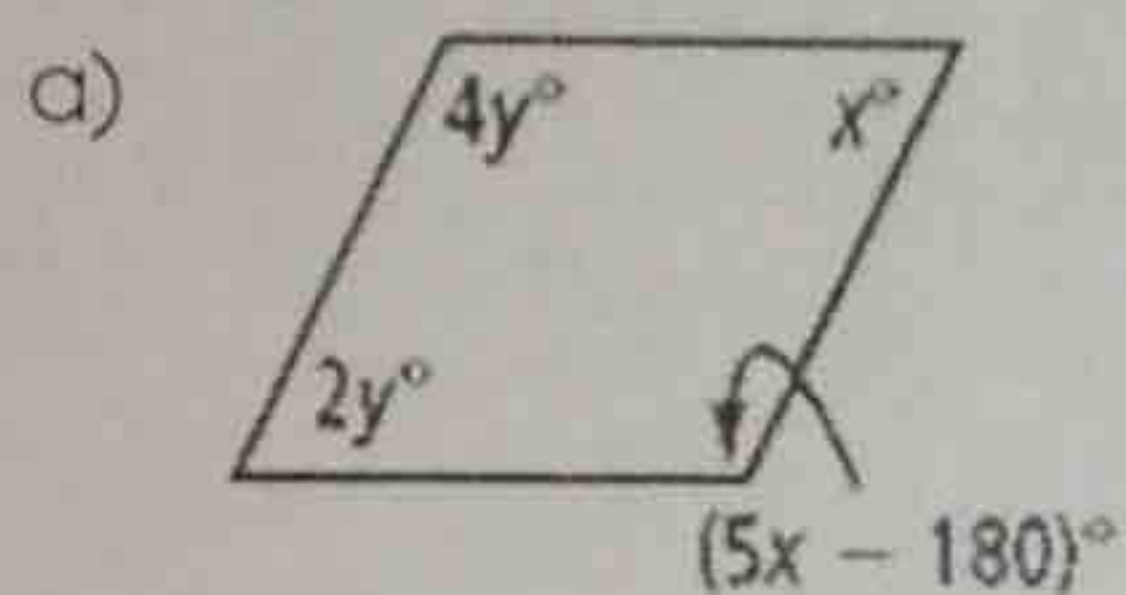


Example 2: Given: $\square ABCD$ is a parallelogram.
 Prove: AC and BD bisect each other at E .

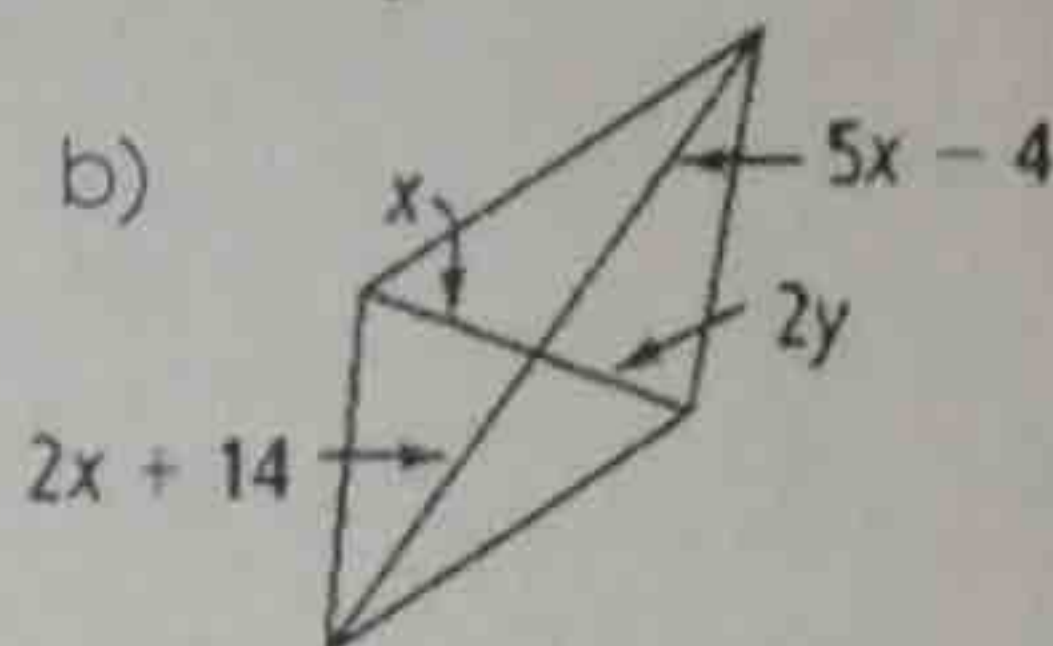


Statement	Reason
1. $ABCD$ is a parallelogram	1. Given
2. $\overline{AB} \parallel \overline{DC}$	2. Def. of \square
3. $\angle 1 \cong \angle 4, \angle 2 \cong \angle 3$	3. Alt. int. $\angle s \cong$
4. $\overline{AB} \cong \overline{DC}$	4. Opp. sides of $\square \cong$
5. $\triangle ABE \cong \triangle CDE$	5. ASA
6. $\overline{AE} \cong \overline{CE}, \overline{BE} \cong \overline{DE}$	6. CPCTC
7. E is the midpoint of \overline{AC} & \overline{BD}	7. Definition of bisector midpoint
8. \overline{AC} & \overline{BD} bisect each other at E	8. Def. of seg. bisectors

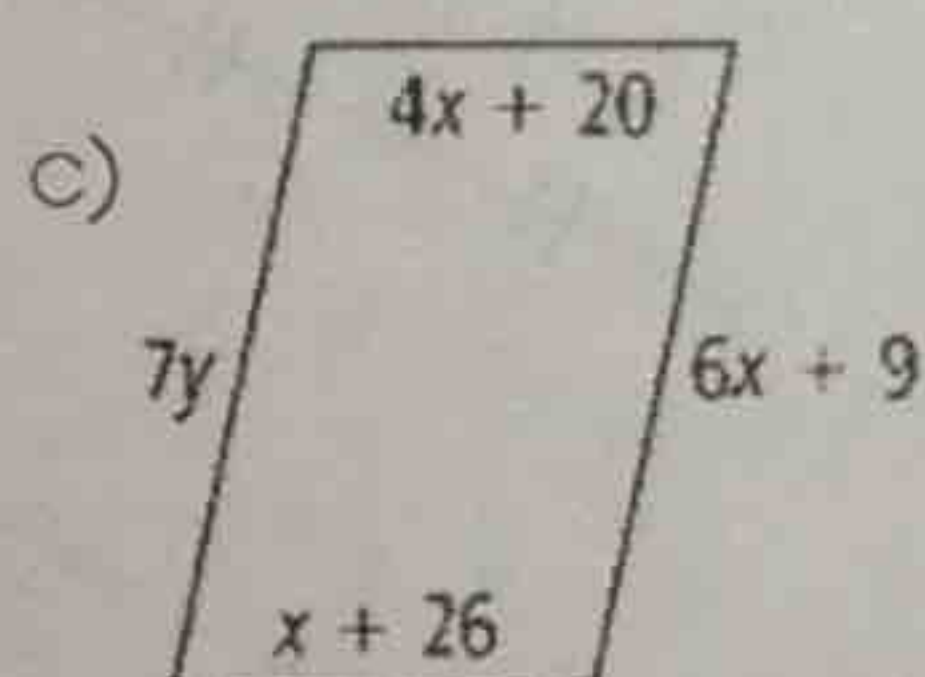
Example 3: For what values of x and y must each figure be a parallelogram?



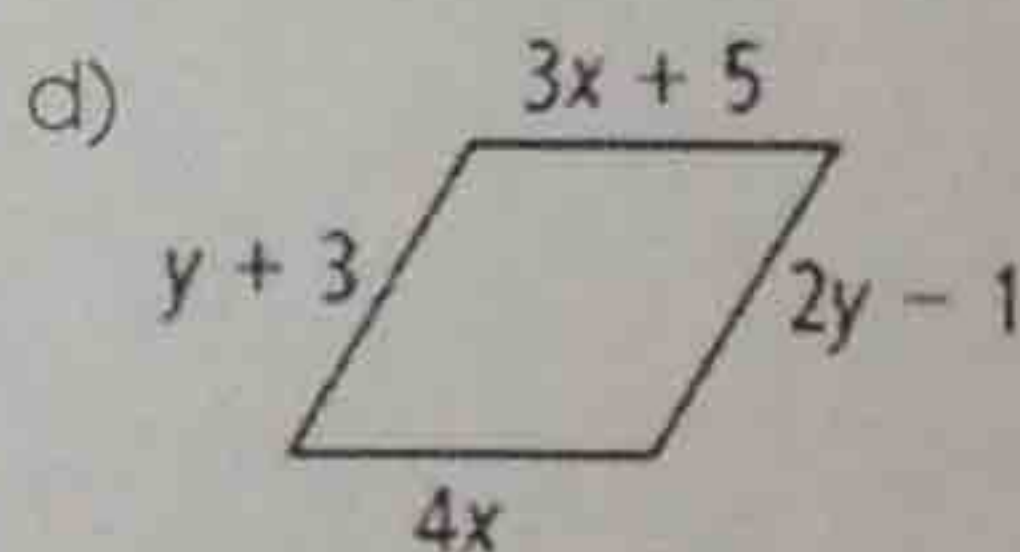
$$\begin{aligned} 4y + 2y &= 180 & 2(30) &= x \\ 6y &= 180 & 60 &= x \\ y &= 30 \end{aligned}$$



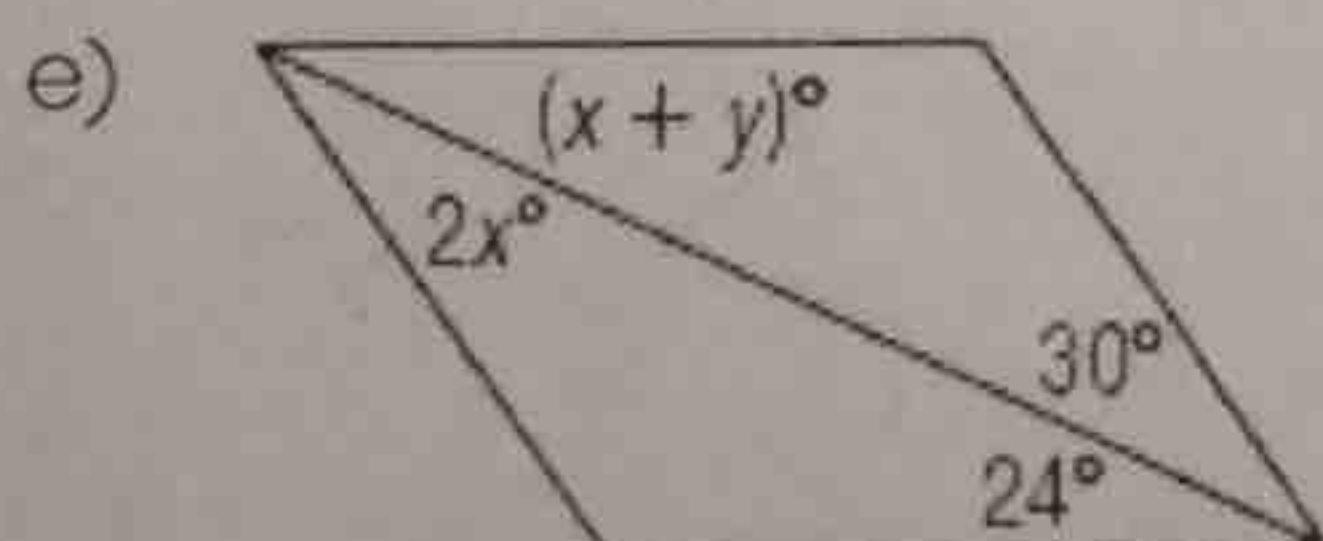
$$\begin{aligned} 5x - 4 &= 2x + 14 & 6 &= 2y \\ 3x &= 18 & y &= 3 \\ x &= 6 \end{aligned}$$



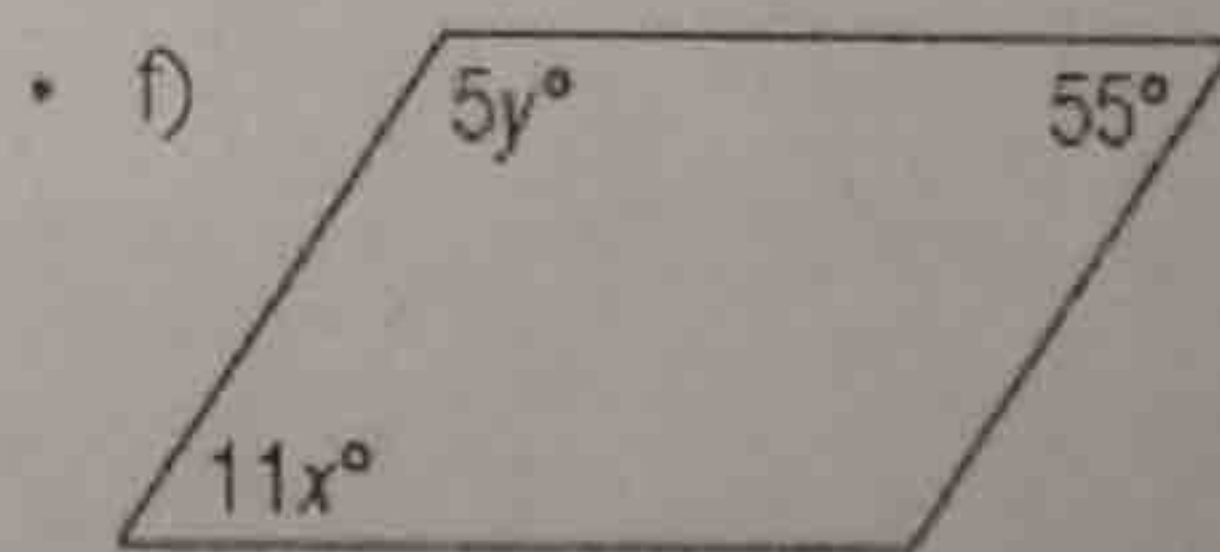
$$\begin{aligned} 4x + 20 &= x + 26 & 7y &= 6(2) + 9 \\ 3x &= 6 & 7y &= 21 \\ x &= 2 & y &= 3 \end{aligned}$$



$$\begin{aligned} 4x &= 3x + 5 & 2y - 1 &= y + 3 \\ x &= 5 & y &= 4 \end{aligned}$$



$$\begin{aligned} 2x &= 30 & 15 + y &= 24 \\ x &= 15 & y &= 9 \end{aligned}$$



$$\begin{aligned} 11x &= 55 & 55 + 5y &= 180 \\ x &= 5 & 5y &= 125 \\ & & y &= 25 \end{aligned}$$