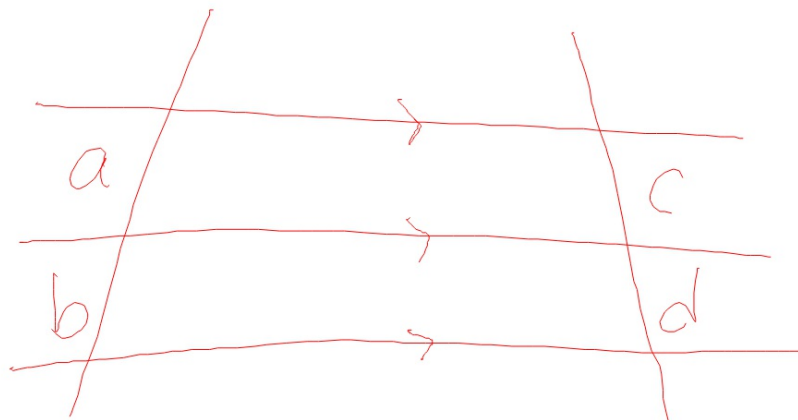


Theorem: If three (or more) parallel lines cut off congruent segments on one transversal, then they cut off congruent segments on every transversal.



If $a = b$, then $c = d$.

Summary:

Parallelograms:

4 sides
 \angle s add to 360

Opp sides \cong , \parallel
 Consec. \angle s supp
 opp \angle s \cong
 diagonals bisect \angle s
 diagonals bisect each other

Questions

5.3 Essential Question: How do you prove a quad is a ||-gram?
In order to conclude that a figure is a parallelogram, we can use one of the following theorems:

- 1) If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram.
- 2) If one pair of opposite sides of a quadrilateral is both \cong and \parallel , then the quadrilateral is a parallelogram.
- 3) If both pairs of opposite sides of a quadrilateral are \cong , then the quadrilateral is a parallelogram.
- 4) If both pairs of opposite sides of a quadrilateral are \parallel , then the quadrilateral is a parallelogram.
- 5) If both pairs of opposite \angle s of a quadrilateral are \cong , then the quadrilateral is a parallelogram.

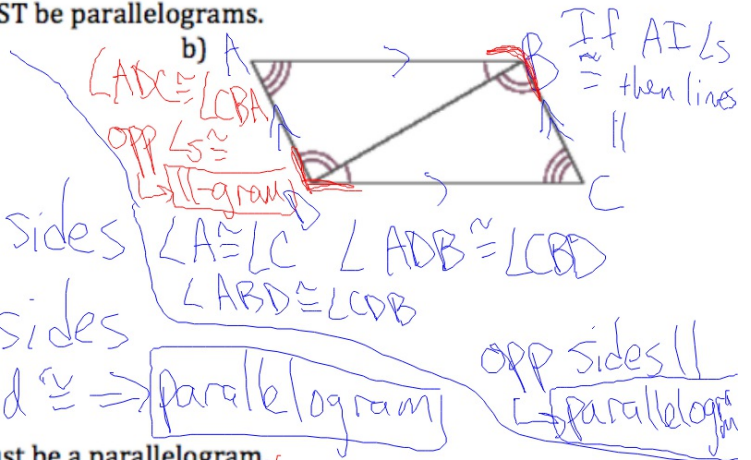
1. Determine whether the following figures MUST be parallelograms.

a)

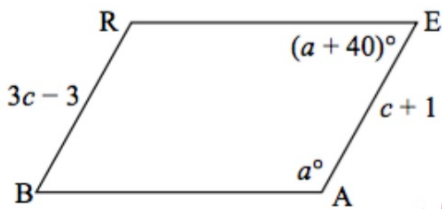


One pair \parallel opp sides
 One pair opp \cong sides
 One pair opp sides \parallel and $\cong \Rightarrow$ parallelogram

b)



2. Find the values of a and c for which BREA must be a parallelogram.



SSI Ls supp \Rightarrow lines \parallel

Summary:

$$\begin{array}{l}
 a = 70 \quad \left\{ \quad c = 2 \right. \\
 a + 40 + a = 180 \\
 2a + 40 = 180 \\
 \quad -40 \quad -40 \\
 \hline
 2a = \frac{140}{2} \quad a = 70 \\
 \\
 3c - 3 = c + 1 \\
 \quad +3 \quad +3 \\
 \hline
 3c = c + 4 \\
 \quad -c \quad -c \\
 \hline
 2c = 4 \\
 \quad \frac{2}{2} \quad \frac{2}{2} \\
 \quad \quad c = 2
 \end{array}$$