

GOALS:

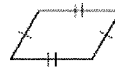
- Know conditions necessary to show a quad. is a parallelogram
- Prove that a set of points forms a parallelogram in the coordinate plane
- Find area of a parallelogram

CONCEPT SUMMARY: WAYS TO PROVE A QUADRILATERAL IS A PARALLELOGRAM

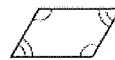
1. Show both pairs of opposite sides are parallel. (**Definition**)



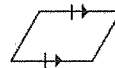
2. Show both pairs of opposite sides are congruent. (**Theorem 8.9**)



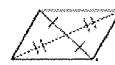
3. Show both pairs of opposite angles are congruent. (**Theorem 8.10**)



4. Show one pair of opposite sides are congruent and parallel. (**Theorem 8.12**)

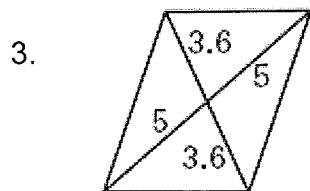
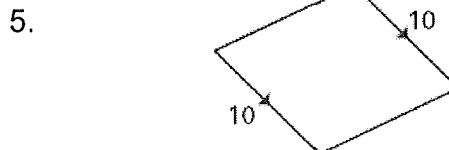
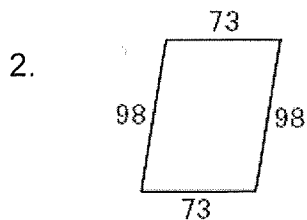
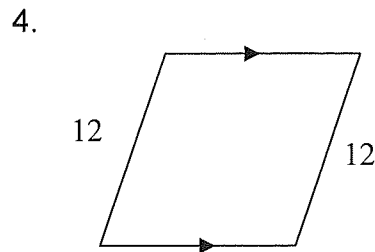
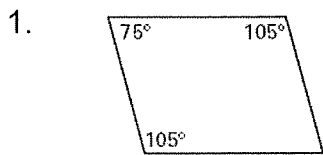


5. Show the diagonals bisect each other. (**Theorem 8.11**)



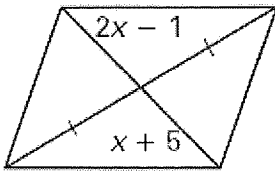
Examples:

Determine whether the quadrilateral is a parallelogram. **JUSTIFY** your answer!

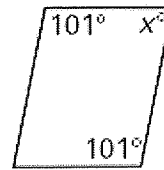


Solve for x so that the quadrilateral is a parallelogram!

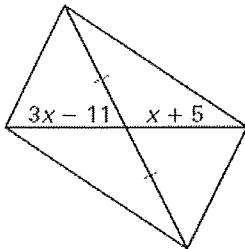
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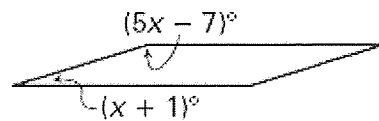
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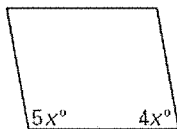
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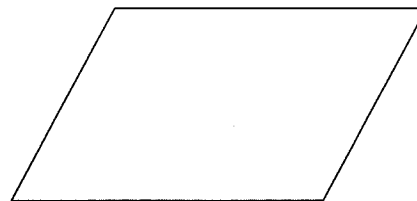
10.



8.

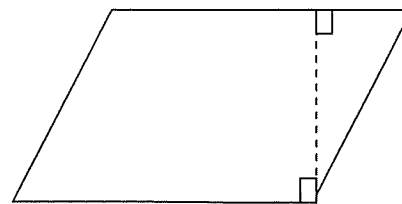


Consider the following parallelogram:

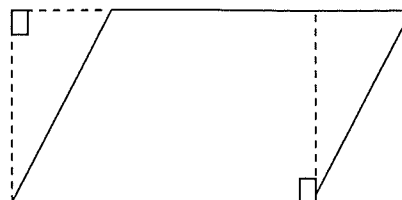


Label the base (b) and height (h).

If we draw in a height (label it h) as shown, we create a right triangle on the right.



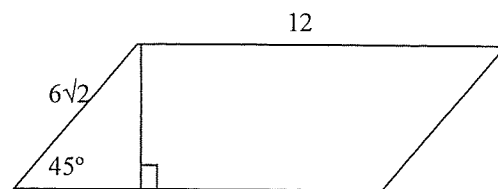
If we move the right triangle all the way to the left as shown, have we changed the area of the original parallelogram?



So, how do you think we find the area of a Parallelogram?

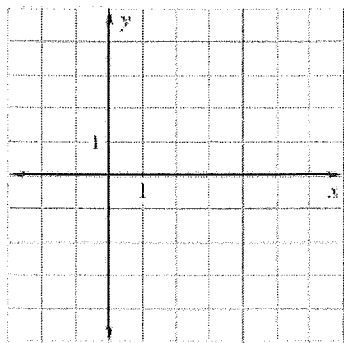
A = _____

11. Find the area of the parallelogram.

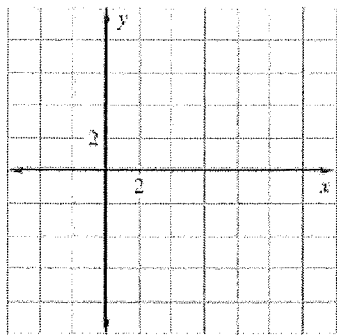


Are the figures with the following coordinates parallelograms? Why or why not? (If #12 is a parallelogram, find its area.)

12. $A(-2, -3), B(0, 5), C(6, 5), D(4, -3)$



13. $A(-3, -4), B(-1, 2), C(7, 0), D(5, -6)$



14. Use distance and slope to see if quadrilateral PQRS (with the following vertices) is a parallelogram.

$P(-3, -1)$ $Q(-1, 3)$ $R(3, 1)$ $S(1, -3)$