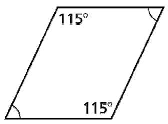
Name ____ Date __________

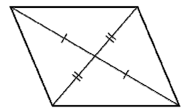
7.3 Practice A

In Exercises 1 and 2, state which theorem you can use to show that the quadrilateral is a parallelogram.

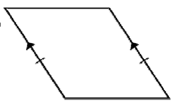
1a.



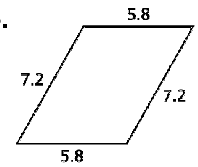
2a.



1b.

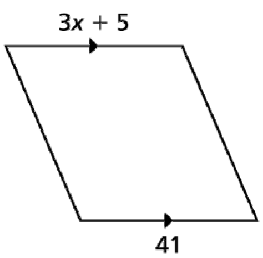


2b.

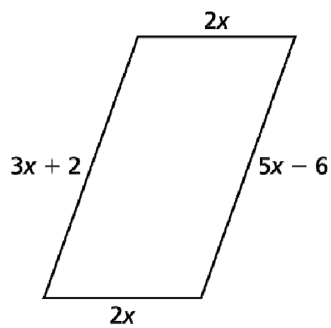


In Exercises 3 and 4, find the value of *x* that makes the quadrilateral a parallelogram.

3.

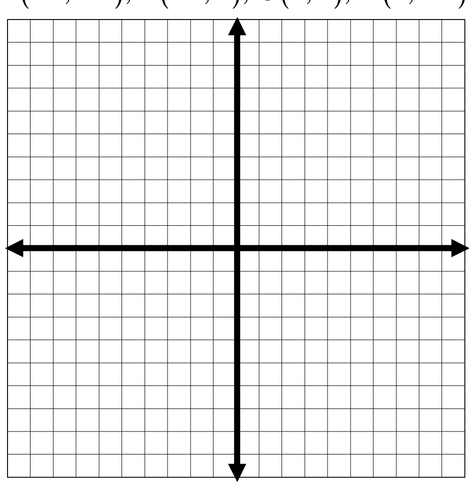


4.

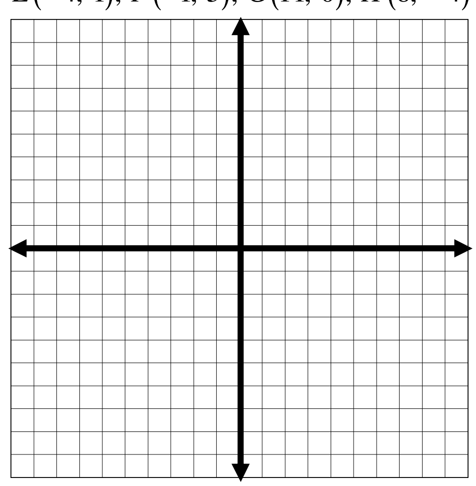


In Exercises 5 and 6, graph the quadrilateral with the given vertices in a coordinate plane. Then show that the quadrilateral is a parallelogram.

5. $A(-4, -2)$, $B(-2, 1)$, $C(4, 1)$, $D(2, -2)$



6. $E(-4, 1)$, $F(-1, 5)$, $G(11, 0)$, $H(8, -4)$



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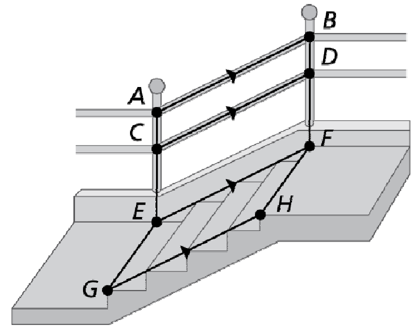

8. In the diagram of the handrail for a staircase shown, $m\angle A = 145°$ and $\overline{AB} \cong \overline{CD}$.

a. Explain how to show that *ABDC* is a parallelogram.

b. Describe how to prove that *CDFE* is a parallelogram.

c. Can you prove that *EFHG* is a parallelogram? Explain.

d. Find $m\angle ACD$, $m\angle DCE$, $m\angle CEF$, and $m\angle EFD$.

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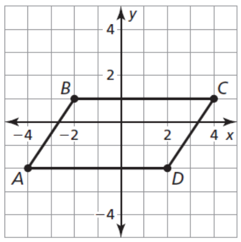
7.3 Practice A

1. Parallelogram Opposite Angles Converse Theorem (Thm. 7.8)

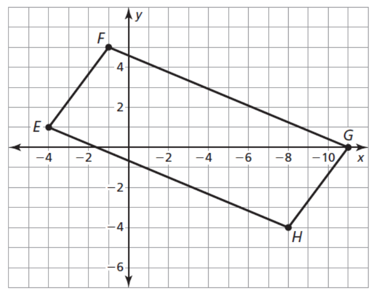
2. Parallelogram Diagonals Converse Theorem (Thm. 7.10)

3. 12

4. 4

5. 

Because $BC = AD = 6$, $\overline{BC} \cong \overline{AD}$. Because both $\overline{BC}$ and $\overline{AD}$ are horizontal line segments, their slope is 0, and they are parallel. $\overline{BC}$ and $\overline{AD}$ are opposite sides that are both congruent and parallel. So, *ABCD* is a parallelogram by the Opposite Sides Parallel and Congruent Theorem (Thm. 7.9).

6. 

Because $EF = GH = 5$ and $EH = FG = 13$, $\overline{EF} \cong \overline{GH}$ and $\overline{EH} \cong \overline{FG}$. Because both pairs of opposite sides are congruent, quadrilateral *EFGH* is a parallelogram by the Parallelogram Opposite Sides Converse (Thm. 7.7).

8. a. Because $\overline{AB} \parallel \overline{CD}$ and $\overline{AB} \cong \overline{CD}$, *ABDE* is a parallelogram by the Opposite Sides Parallel and Congruent Theorem (Thm. 7.9).

   b. Because *ABDC* is a parallelogram, $\overline{CE} \parallel \overline{DF}$. From the diagram, you can see that $\overline{CD} \parallel \overline{EF}$. Because the opposite sides are parallel, *CDFE* is a parallelogram.

   c. no; You are only given that one pair of opposite sides are parallel, which is not enough information to prove that it is a parallelogram.

   d. $m\angle ACD = 35°$, $m\angle DCE = 145°$, $m\angle CEF = 35°$, $m\angle EFD = 145°$

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