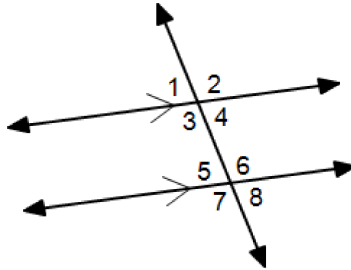


SM2 9.1: Prove Parallelogram Theorems

Problems: Use the figure below for problems 1–2.



1. Identify the pairs of angles that fit each category.

| <u>Linear Pairs</u> | <u>Vertical Angles</u> | <u>Corresponding Angles</u> |
|----------------------------------|----------------------------------|-----------------------------|
| | | |
| <u>Alternate Interior Angles</u> | <u>Alternate Exterior Angles</u> | <u>Same Side Interior</u> |
| | | |

2. Given $m\angle 1 = 72^\circ$, find the measure of the remaining angles

$$m\angle 2 =$$

$$m\angle 6 =$$

$$m\angle 3 =$$

$$m\angle 7 =$$

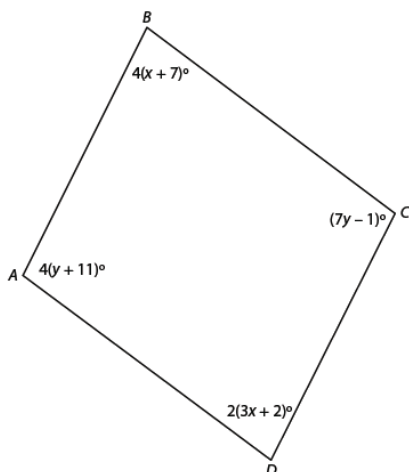
$$m\angle 4 =$$

$$m\angle 8 =$$

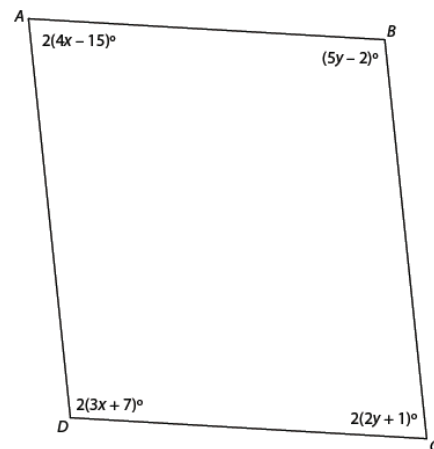
$$m\angle 5 =$$

Find the value(s) of the variable(s) in each parallelogram.

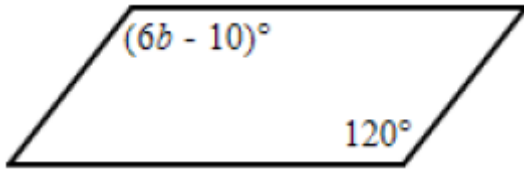
3.



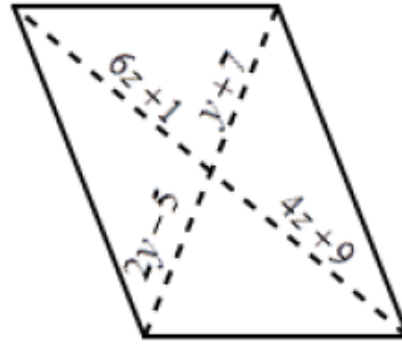
4.



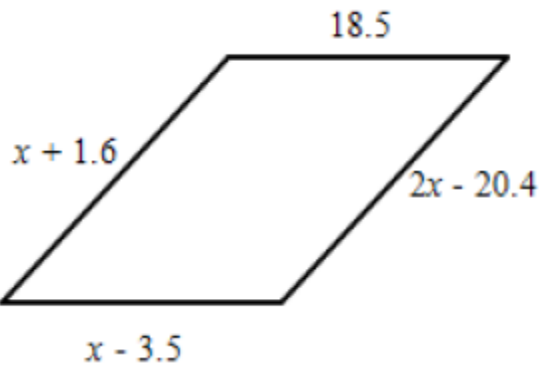
5.



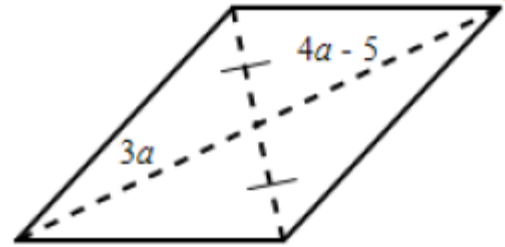
6.



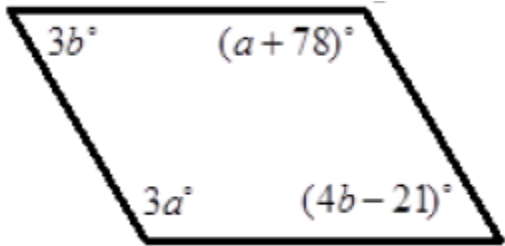
7.



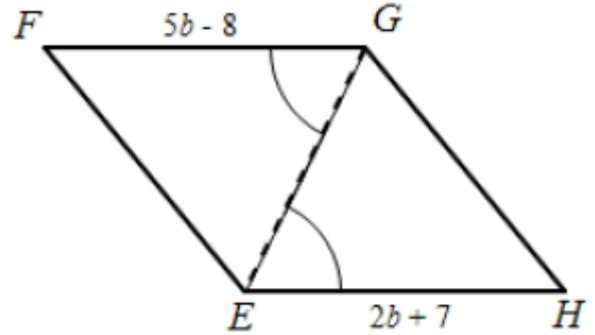
8.



9.



10.



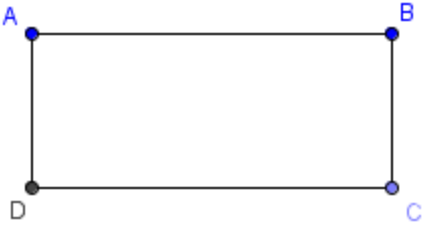
QRST is a rectangle. Find the value of x and the length of each diagonal.

11. $QS = x$ and $RT = 2x - 4$

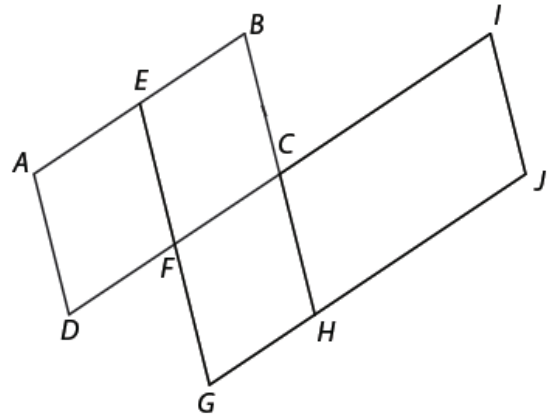
12. $QS = 7x - 2$ and $RT = 4x + 3$

13. $QS = 5x - 8$ and $RT = 2x + 1$

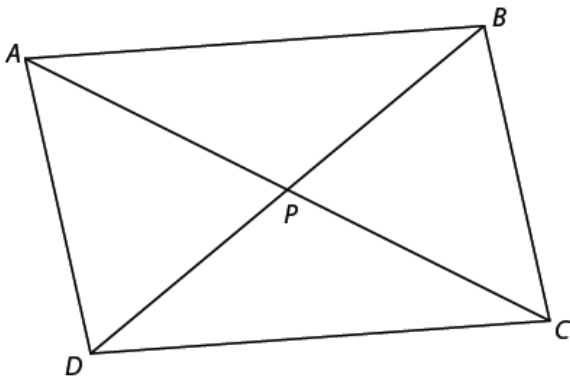
14. If a parallelogram is a rectangle, then its diagonals are congruent. How would you prove this is true? (Explain your reasoning)



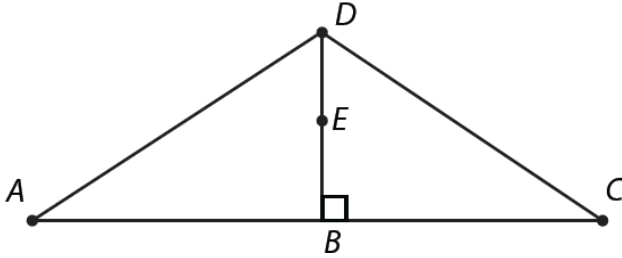
15. Given that $ABCD$, $EBHG$, and $FIJG$ are parallelograms, prove that $\angle D \cong \angle I$



16. Given that $ABCD$ is a parallelogram, prove that $\triangle DPA \cong \triangle BPC$



17. Prove that a point on a perpendicular bisector is equidistant from the endpoints of the segment it bisects given that in $\triangle ACD$, \underline{BD} is the perpendicular bisector of \underline{AC} and point E is on \underline{BD} . Write your answer in a proof.



Given:

\underline{DB} is the perpendicular bisector of \underline{AC} .

E is a point on \underline{DB} .

Prove:

$EA = EC$