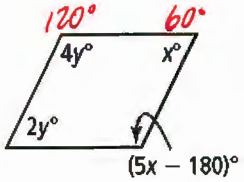
Name Answers Date

6.3 – Proving Quadrilaterals are Parallelograms

For what values of x and y make the quadrilateral a parallelogram?

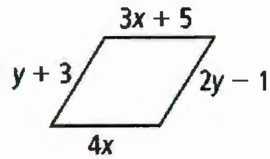
1) 

$2y + 4y = 180$

$6y = 180$

$\boxed{y = 30}$

$\boxed{x = 60°}$

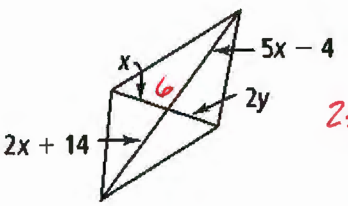
2) 

$4x = 3x + 5$

$\boxed{x = 5}$

$y + 3 = 2y - 1$

$\boxed{4 = y}$

3) 

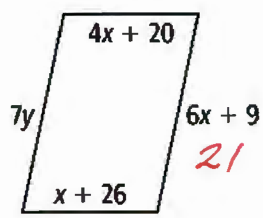
$2x + 14 = 5x - 4$

$18 = 3x$

$\boxed{6 = x}$

$6 = 2y$

$\boxed{3 = y}$

4) 

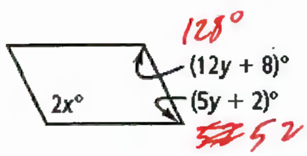
$4x + 20 = x + 26$

$3x = 6$

$\boxed{x = 2}$

$7y = 21$

$\boxed{y = 3}$

5) 

$(12y + 8) + (5y + 2) = 180$

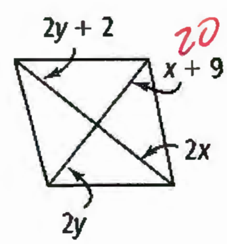
$17y + 10 = 180$

$17y = 170$

$\boxed{y = 10}$

$2x = 128$

$\boxed{x = 64°}$

6) 

$2y + 2 = 2x \rightarrow -2x + 2y = -2$

$x + 9 = 2y \qquad x - 2y = -9$

$-1x = -11$

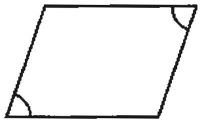
$\boxed{x = 11}$

$2y = 20$

$\boxed{y = 10}$

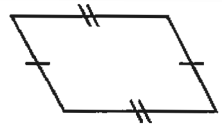
Can you prove that the quadrilateral is a parallelogram based on the given information? Explain.

7)



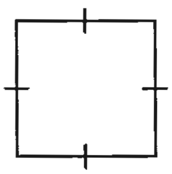
No. Not enough info.
You need both pairs of opp. angles ≅

8)



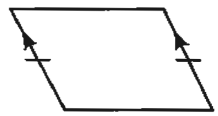
Yes. Two pairs of opp. sides ≅.

9)



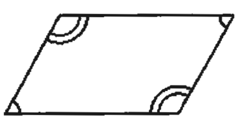
Yes. Opp. sides ≅

10)



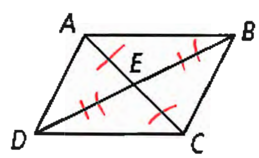
Yes. One pair of sides both parallel and congruent.

11)



Yes. Opp. angles ≅

12) $\overline{AE} \cong \overline{EC}$, $\overline{BE} \cong \overline{ED}$



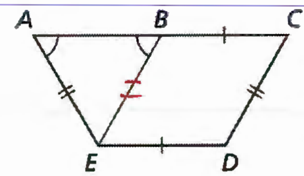
Yes. Diagonals bisect each other.

13) Write a two-column proof.

Given: $\angle A \cong \angle ABE$

$\overline{AE} \cong \overline{CD}$, $\overline{BC} \cong \overline{DE}$

Prove: $BCDE$ is a parallelogram.



Statement	Reasons
$\angle A \cong \angle ABE$	Given
$\overline{AE} \cong \overline{CD}$, $\overline{BC} \cong \overline{DE}$	Given
$\overline{AE} \cong \overline{BE}$	Converse of Base Angles Th.
$\overline{BE} \cong \overline{CD}$	Transitive Property
BCDE is a parallelogram	Converse of Opp. Sides Th.

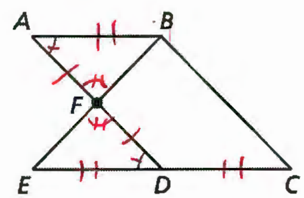
14) Write a two-column proof.

Given: $\angle A \cong \angle FDE$

F is the midpoint of $\overline{AD}$.

D is the midpoint of $\overline{CE}$.

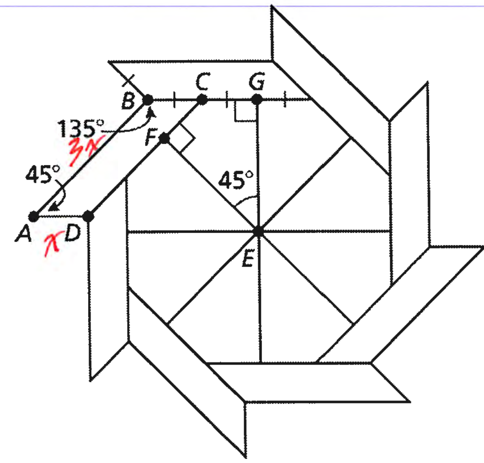
Prove: $ABCD$ is a parallelogram.



Statement	Reasons
$\angle A \cong \angle FDE$	Given
F is the midpoint of $\overline{AD}$	Given
D is the midpoint of $\overline{CE}$	Given
$\overline{AF} \cong \overline{DF}$	Def. of a midpoint
$\angle AFB \cong \angle DFE$	VA
$\triangle AFB \cong \triangle DFE$	ASA
$\overline{AB} \cong \overline{ED}$	CPCTC
$\overline{ED} \cong \overline{DC}$	Def. of a midpoint
$\overline{AB} \cong \overline{DC}$	Transitive Property
$\overline{AB} \parallel \overline{ED}$ (and $\overline{DC}$)	Converse AIA
ABCD is a parallelogram	~~ABCD is a parallelogram~~ Same side parallel and congruent Th.

15) An octagon star is shown in the figure on the right.

a) Find $m\angle FCG$, $m\angle BCF$, and $m\angle D$.



$m\angle FCG = 135°$

$m\angle BCF = 45°$

$m\angle D = 135°$

b) State which theorem you can use to show that the quadrilateral is a parallelogram.

Converse of opp angles theorem.

c) The length of $\overline{AB}$ is three times the length of $\overline{AD}$. Write an expression for the perimeter of parallelogram $ABCD$ in terms of the variable x.

Perimeter $= x + 3x + x + 3x$

$= 8x$