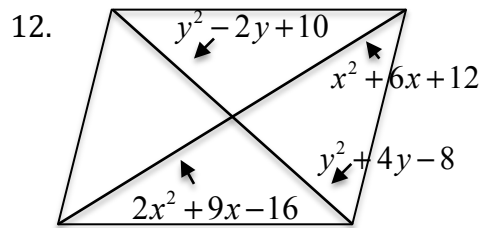Secondary Math 2
6-4 Parallelograms
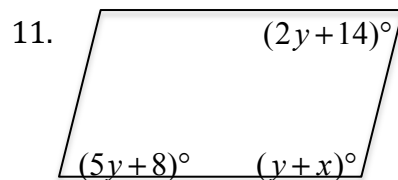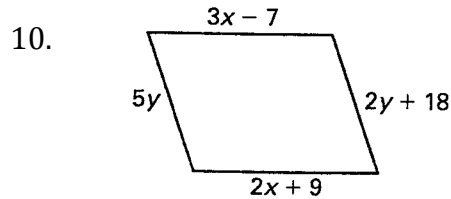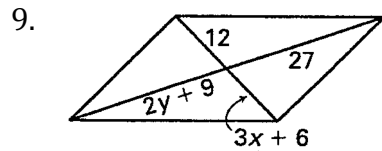
Name_____
Period_____

Use the diagram of parallelogram *MNOP* at the right. Complete the statement and give a reason.
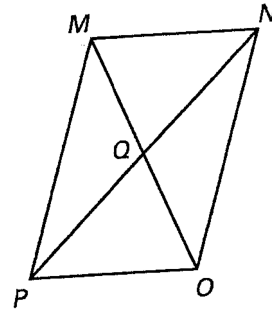
1. $\overline{MN} \cong$ Reason:

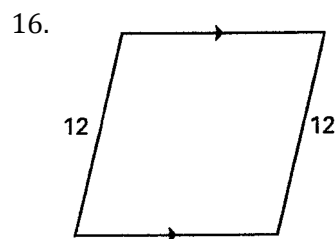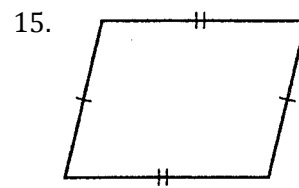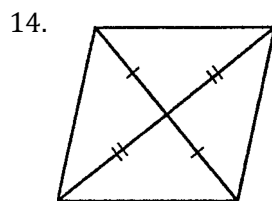2. $MN \parallel$ Reason:

3. $\overline{ON} \cong$ Reason:

4. $\angle MPO \cong$ Reason:

5. $\overline{PQ} \cong$ Reason:

6. $\overline{QM} \cong$ Reason:

7. $\angle MQN \cong$ Reason:

8. $\angle NPO \cong$ Reason:

Find the value of each variable in the parallelogram.

9.

12
27
2y + 9
3x + 6

10.

3x − 7
5y
2y + 18
2x + 9

11.

$(2y+14)°$
$(5y+8)°$ $(y+x)°$

12.

$y^2 - 2y + 10$
$x^2 + 6x + 12$
$y^2 + 4y - 8$
$2x^2 + 9x - 16$

Are you given enough information to determine whether the quadrilateral is a parallelogram?

13.

14.

15.

16.

12   12

17.

18.

120°   60°
60°
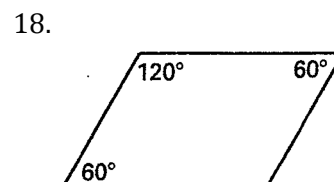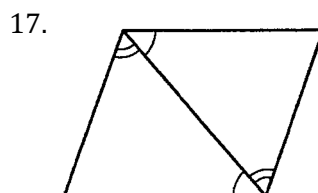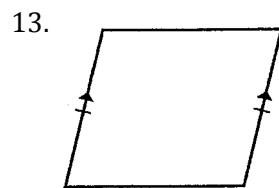
19. Prove that if a quadrilateral is a parallelogram then the opposite angles are congruent. You may use a flow or two-column proof to do this.
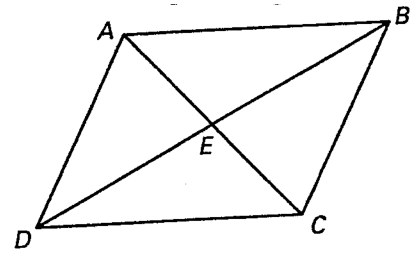
Hint: You can use $\triangle ADC$ and $\triangle ABC$ and the fact that you know that opposite sides of a parallelogram are congruent to prove this. Or you can use parallel transversals to prove this.

Given: Parallelogram ABCD with diagonals that meet at E

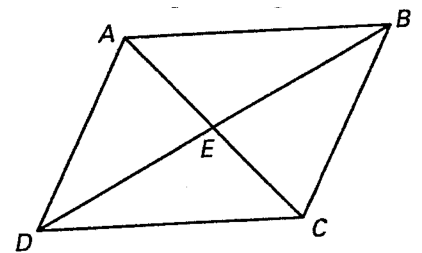Prove: $\angle ADC \cong \angle ABC$

20. Prove that is you know that the opposite sides of a quadrilateral are congruent then it is a parallelogram.

Hint: use congruent triangles and the Alt int converse theorem twice.

Given: $\overline{DA} \cong \overline{CB}$ and $\overline{AB} \cong \overline{DC}$

Prove: $\overline{DA} \parallel \overline{CB}$ and $\overline{AB} \parallel \overline{DC}$

Answer Key (Not all odds):

1. $\overline{MN} \cong \overline{OP}$,   Reason: In a parallelogram opposite sides are $\cong$
5. $\overline{PQ} \cong \overline{NQ}$,   Reason: In a parallelogram diagonals bisect each other
7. $\angle MQN \cong \angle OQP$ Vertical $\angle 's$
9. $y = 9, x = 2$
11. $x = 160, y = 2$
13. yes
17. yes