**3-2 Study Guide and Intervention****Angles and Parallel Lines**

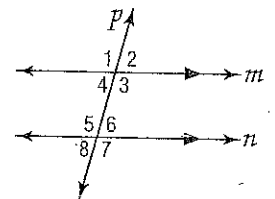
Parallel Lines and Angle Pairs When two parallel lines are cut by a transversal, the following pairs of angles are congruent.

- corresponding angles
- alternate interior angles
- alternate exterior angles

Also, consecutive interior angles are supplementary.

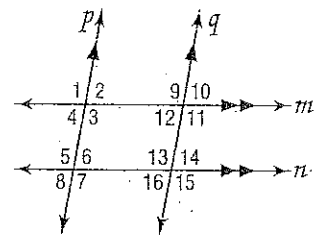
Example In the figure, $m\angle 2 = 75$. Find the measures of the remaining angles.

- $m\angle 1 = 105$ $\angle 1$ and $\angle 2$ form a linear pair.
 $m\angle 3 = 105$ $\angle 3$ and $\angle 2$ form a linear pair.
 $m\angle 4 = 75$ $\angle 4$ and $\angle 2$ are vertical angles.
 $m\angle 5 = 105$ $\angle 5$ and $\angle 3$ are alternate interior angles.
 $m\angle 6 = 75$ $\angle 6$ and $\angle 2$ are corresponding angles.
 $m\angle 7 = 105$ $\angle 7$ and $\angle 3$ are corresponding angles.
 $m\angle 8 = 75$ $\angle 8$ and $\angle 6$ are vertical angles.

**Exercises**

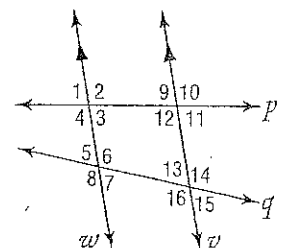
In the figure, $m\angle 3 = 102$. Find the measure of each angle.

- | | |
|----------------|----------------|
| 1. $\angle 5$ | 2. $\angle 6$ |
| 3. $\angle 11$ | 4. $\angle 7$ |
| 5. $\angle 15$ | 6. $\angle 14$ |



In the figure, $m\angle 9 = 80$ and $m\angle 5 = 68$. Find the measure of each angle.

- | | |
|----------------|-----------------|
| 7. $\angle 12$ | 8. $\angle 1$ |
| 9. $\angle 4$ | 10. $\angle 3$ |
| 11. $\angle 7$ | 12. $\angle 16$ |



3-2 Study Guide and Intervention *(continued)*

Angles and Parallel Lines

Algebra and Angle Measures Algebra can be used to find unknown values in angles formed by a transversal and parallel lines.

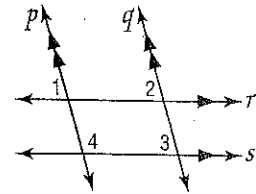
Example If $m\angle 1 = 3x + 15$, $m\angle 2 = 4x - 5$, $m\angle 3 = 5y$, and $m\angle 4 = 6z + 3$, find x and y .

$p \parallel q$, so $m\angle 1 = m\angle 2$
because they are corresponding angles.

$$\begin{aligned} 3x + 15 &= 4x - 5 \\ 3x + 15 - 3x &= 4x - 5 - 3x \\ 15 &= x - 5 \\ 15 + 5 &= x - 5 + 5 \\ 20 &= x \end{aligned}$$

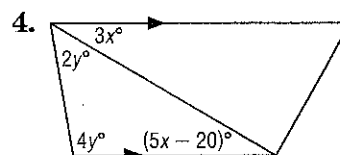
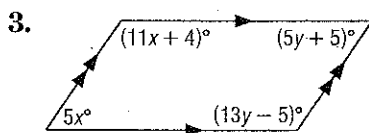
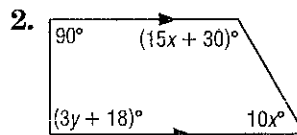
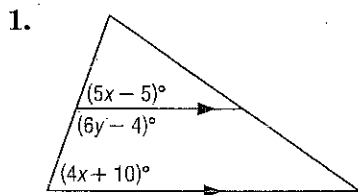
$r \parallel s$, so $m\angle 2 = m\angle 3$
because they are corresponding angles.

$$\begin{aligned} m\angle 2 &= m\angle 3 \\ 75 &= 5y \\ \frac{75}{5} &= \frac{5y}{5} \\ 15 &= y \end{aligned}$$

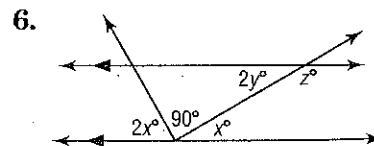
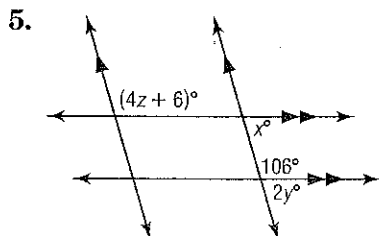


Exercises

Find x and y in each figure.



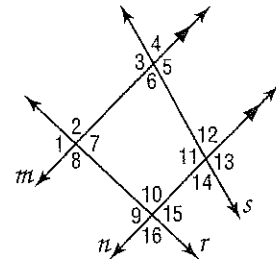
Find x , y , and z in each figure.



3-2 Practice

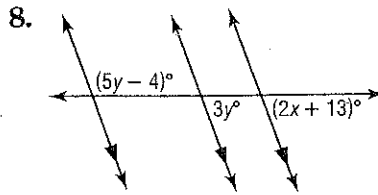
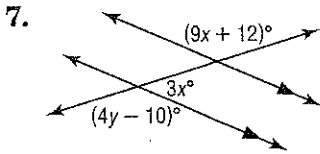
Angles and Parallel Lines

In the figure, $m\angle 2 = 92$ and $m\angle 12 = 74$. Find the measure of each angle.

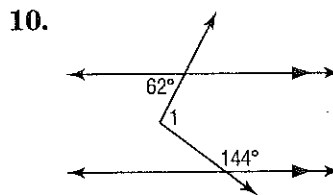
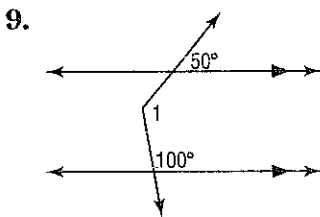


1. $\angle 10$
2. $\angle 8$
3. $\angle 9$
4. $\angle 5$
5. $\angle 11$
6. $\angle 13$

Find x and y in each figure.



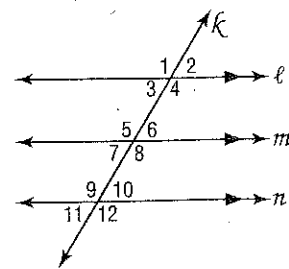
Find $m\angle 1$ in each figure.



11. **PROOF** Write a paragraph proof of Theorem 3.3.

Given: $l \parallel m, m \parallel n$

Prove: $\angle 1 \cong \angle 12$



12. **FENCING** A diagonal brace strengthens the wire fence and prevents it from sagging. The brace makes a 50° angle with the wire as shown. Find y .

