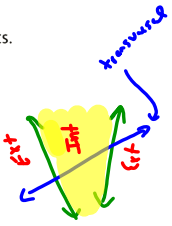
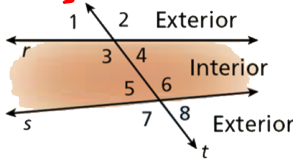


Angle Pairs Formed by a Transversal

A transversal is a line that intersects two coplanar lines at two different points. The transversal  $t$  and the other two lines  $r$  and  $s$  form eight angles.

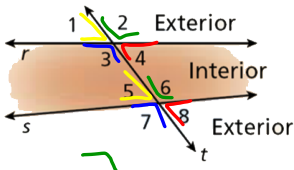


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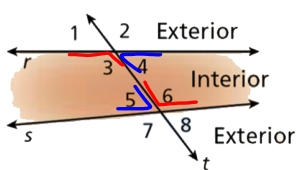
Corresponding angles lie on the same side of the transversal  $t$ , on the same sides of lines  $r$  and  $s$ .

$\angle 3$  and  $\angle 7$   
 $\angle 1$  and  $\angle 5$   
 $\angle 2$  and  $\angle 6$   
 $\angle 4$  and  $\angle 8$



Alternate interior angles are nonadjacent angles that lie on opposite sides of the transversal  $t$ , between lines  $r$  and  $s$ .

$\angle 3$  and  $\angle 6$   
 $\angle 4$  and  $\angle 5$

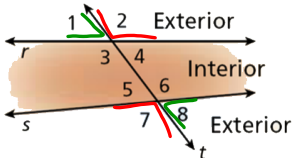


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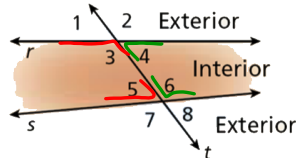
Alternate exterior angles lie on opposite sides of the transversal  $t$ , outside lines  $r$  and  $s$ .

$\angle 1$  and  $\angle 8$   
 $\angle 2$  and  $\angle 7$



Same-side interior angles or consecutive interior angles lie on the same side of the transversal  $t$ , between lines  $r$  and  $s$ .

$\angle 4$  and  $\angle 6$   
 $\angle 3$  and  $\angle 5$



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Give an example of each:

- A. corresponding angles  
1,5    2,6
- B. alternate interior angles  
4,6  
2,8    1,7
- C. alternate exterior angles  
2,8    1,7
- D. same-side interior angles  
4,5    3,6

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a. $\angle 4$ and $\angle 7$ Same-side int.	b. $\angle 2$ and $\angle 11$ alt ext
c. $\angle 12$ and $\angle 16$ corresp $\angle$ 's	d. $\angle 8$ and $\angle 13$ alt int
e. $\angle 11$ and $\angle 15$ corr	f. $\angle 7$ and $\angle 10$ None
g. $\angle 1$ and $\angle 14$ ALT EXT	h. $\angle 12$ and $\angle 15$ SS int
i. $\angle 6$ and $\angle 7$ None	j. $\angle 1$ and $\angle 3$ Corres
k. $\angle 12$ and $\angle 16$ Corresponding	l. $\angle 6$ and $\angle 15$ ALT EXT
m. $\angle 5$ and $\angle 10$ ALT int	n. $\angle 8$ and $\angle 14$ same side int

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Nov 14-8:33 AM

**Objective**

Prove and use theorems about the angles formed by parallel lines and a transversal.

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What is the difference between the two figures?

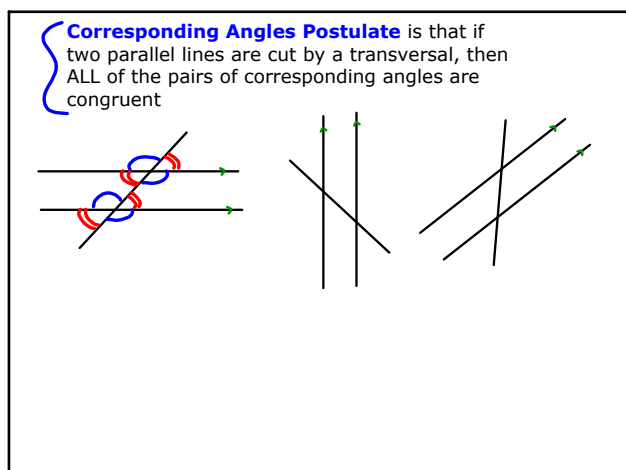
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**Special Case:** When the transversal cuts **2 parallel lines**

What kind of angles are  $\angle 1$  and  $\angle 3$ ?

What appears to be true about the angles?

Nov 13-3:57 PM



Nov 13-4:00 PM

When the angle pairs are formed by a transversal that cuts two parallel lines, what do we know?

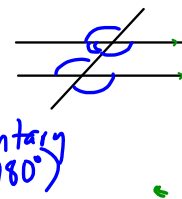
Same measure

Corresponding - Same measure

Alternate Interior - Same measure

Alternate Exterior - supplementary (sum to 180°)

Same-side Interior -



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1. When a transversal cuts **parallel lines**, all of the acute angles formed are congruent, and all of the obtuse angles formed are congruent.

2. When parallel lines are cut by a transversal line, any one acute angle formed and any one obtuse angle formed are supplementary.

Ex. 1

Find the value of  $x$  so that the lines are parallel.

$$\begin{aligned}
 3x + 20 &= 2x + 40 \\
 -2x &\quad -2x \\
 x + 20 &= 40 \\
 -20 &\quad -20 \\
 x &= 20
 \end{aligned}$$

corr.  $\angle$ 's are  $\cong$

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Ex. 2 Find the value of  $x$  so that the lines are parallel.

$$\begin{aligned}
 4x - 10 &= 2x + 20 \\
 -2x &\quad -2x \\
 2x - 10 &= 20 \\
 +10 &\quad +10 \\
 2x &= 30 \\
 \frac{2x}{2} &= \frac{30}{2} \\
 x &= 15
 \end{aligned}$$

Alt. int.  $\angle$ 's  $\cong$

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Ex. 3 Find the value of  $x$  so that the lines are parallel.

$$\begin{aligned}
 (5x - 10) + (8x - 5) &= 180 \\
 5x - 10 + 8x - 5 &= 180 \\
 13x - 15 &= 180 \\
 +15 &\quad +15 \\
 13x &= 195 \\
 \frac{13x}{13} &= \frac{195}{13} \\
 x &= 15
 \end{aligned}$$

Same-side int. are suppl.

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