

Parallel Lines Cut by a Transversal Practice

**A. Identifying Angle Pairs and their relationships...** The rules:

\***Vertical** angles are **across an X** from each other (**always congruent**)

\***Linear Pair** angles **form a line** (**always add to equal 180°**)

\***Corresponding** are in **matching** places (**congruent, if the lines are parallel**)

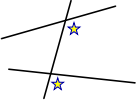
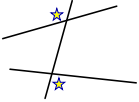
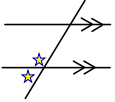
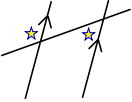
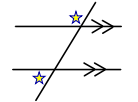
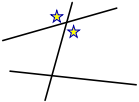
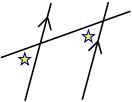
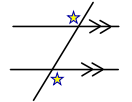
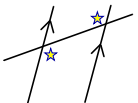
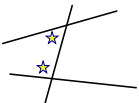
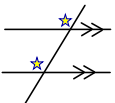

\***Alternate** angles are in **opposite** places (**congruent, if the lines are parallel**)

~Interior are the ones *between the lines*

~Exterior are the ones *outside the lines*

\***Unlisted** angles are **none of the above** (**add to equal 180°, if the lines are parallel**)

For each set of lines cut by a transversal shown below, a) identify the type of angle pair that is marked and b) if they are congruent, add to equal 180°, or are not solvable.

1. 	2. 	3. 	4. 
5. 	6. 	7. 	8. 
9. 	10. 	11. 	12. 

**B. Solving for Angle Measures...**The rules:

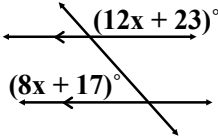
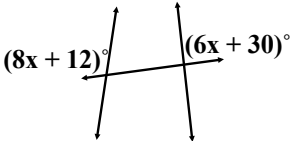
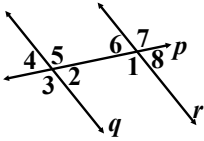
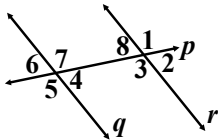
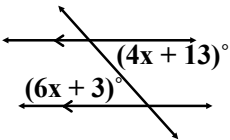
\***Vertical** ( $\cong$ ) angles and **Linear Pair** ( $+ = 180^\circ$ ) angles are **always solvable**—parallel doesn't matter.

\*The other angle pairs are **only solvable if the lines are parallel**

~**Corresponding & Alternate** are congruent

~Everything else **adds to equal 180°**

Determine the measure of  $x$ .

1. 	2. $\angle 6$ and $\angle 8$ are a linear pair. $m\angle 6 = (10x - 3)^\circ$ and $m\angle 8 = (13x - 12)^\circ$ .
3. 	4. $m\angle 3 = (14x + 2)^\circ$ and $m\angle 5 = (16x - 18)^\circ$ 
5. $q \parallel r$ , $m\angle 7 = (8x + 16)^\circ$ and $m\angle 1 = (6x + 42)^\circ$ 	6. 

<p>7.</p>	<p>8. <math>\angle 2</math> and <math>\angle 7</math> are alternate exterior angles on parallel lines. <math>m\angle 2 = (15x + 9)^\circ</math> and <math>m\angle 3 = (6x + 18)^\circ</math>.</p>
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**C. Determining if lines are parallel...**The rules:

\*If the **corresponding** or **alternate** angles are **congruent**, then the lines are ***parallel***

~If they're **not congruent**, then the lines are ***not parallel***

\*If the **unlisted** angles **add to equal 180°**, then the lines are ***parallel***

<p>1. <math>m\angle 1 = 38^\circ</math> &amp; <math>m\angle 2 = 52^\circ</math>. Is <math>g \parallel h</math>?</p>	<p>2. <math>m\angle 1 = 124^\circ</math> &amp; <math>m\angle 2 = 56^\circ</math>. Is <math>g \parallel h</math>?</p>
<p>3. <math>m\angle 1 = 65^\circ</math> &amp; <math>m\angle 2 = 65^\circ</math>. Is <math>g \parallel h</math>?</p>	<p>4. <math>m\angle 1 = 120^\circ</math> &amp; <math>m\angle 2 = 50^\circ</math>. Is <math>g \parallel h</math>?</p>
<p>5. <math>m\angle 1 = (4x + 2)^\circ</math> &amp; <math>m\angle 2 = (6x - 14)^\circ</math>. <math>x = 8</math>. Is <math>g \parallel h</math>?</p>	<p>6. <math>m\angle 1 = (5x - 3)^\circ</math> &amp; <math>m\angle 2 = (9x + 10)^\circ</math>. <math>x = 12</math>. Is <math>g \parallel h</math>?</p>
<p>7. <math>\angle 1 = (10x - 5)^\circ</math> &amp; <math>m\angle 2 = (4x + 31)^\circ</math>. <math>x = 4</math>. Is <math>g \parallel h</math>?</p>	<p>8. <math>m\angle 1 = (8x + 10)^\circ</math> &amp; <math>m\angle 2 = (10x - 20)^\circ</math>. <math>x = 15</math>. Is <math>g \parallel h</math>?</p>

**D. Writing Proofs for Parallel Lines Cut by a Transversal...** The rules:

\***Corresponding Angles Postulate** or **Alternate (Interior/Exterior) Angles Theorem**  
is the reason angles are congruent, if you've already shown the lines are parallel

\* **Same Side Interior Angles Theorem**  
is the reason angles add to equal 180°, if you've already shown the lines are parallel

\***Converse of the Corresponding Angles Postulate** or **Alternate (Interior/Exterior) Angles Theorem**  
is the reason **lines are parallel**, if you've already shown the angles are congruent

\***Converse of the Same Side Interior Angles Theorem**  
is the reason **lines are parallel**, if you've already shown the angles add to equal 180°

<p>1. If <b>corresponding angles are congruent</b>, then I know that the <b>lines are parallel</b> because of the... _____</p>	<p>2. If the <b>lines are parallel</b>, then I know that the <b>same Side Interior angles add to equal 180°</b> because of the... _____</p>
<p>3. If the <b>lines are parallel</b>, then I know that the <b>alternate interior angles are congruent</b> because of the... _____</p>	<p>4. If the <b>alternate exterior angles are congruent</b>, then I know that the <b>lines are parallel</b> because of the... _____</p>
<p>5. If the <b>same side interior angles add to equal 180°</b>, then I know that the <b>lines are parallel</b> because of the... _____</p>	<p>6. If the <b>lines are parallel</b>, then I know that the <b>alternate interior angles are congruent</b> because of the... _____</p>