Parallel Lines Cut by a Transversal Properties

There are 4 named types of angle relationships that are created when two lines **that are parallel** are crossed by the same line (called a transversal): “Corresponding,” “Alternate Exterior,” “Alternate Interior,” and “Same Side Interior.”

Look at the identified angle pairs below, and answer the given questions.

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| **Corresponding Angles** | **Alternate Exterior Angles** | **Alternate Interior Angles** | **Same Side Interior Angles** |
|  |  |  |  |
| **and**  are corresponding (matching).  **and**  are corresponding (matching).  **and**  are corresponding (matching).  **and**  are corresponding (matching).  1. What makes an angle pair “corresponding”? | **and**  are alternate (opposite) exterior (outside).  **and**  are alternate (opposite) exterior (outside).  2. What makes an angle pair “alternate exterior”? | **and**  are alternate (opposite) interior (inside).  **and**  are alternate (opposite) interior (inside).  3. What makes an angle pair “alternate interior”? | **and**  are same side interior (inside).  **and**  are same side interior (inside).  4. What makes an angle pair “same side interior”? |
| 5. What are the 4 corresponding angle pairs? | 6. What are the 2 alternate exterior angle pairs? | 7. What are the 2 alternate interior angle pairs? | 8. What are the 2 same side interior angle pairs? |

There are 4 properties about these angles that happen **when the lines are marked as parallel.** They are the:

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| **Corresponding Angles Postulate** | **Alternate Exterior Angles Theorem** | **Alternate Interior Angles Theorem** | **Same Side Interior Angles Theorem** |
| Given steps:  \*The lines are parallel (it says so, or they’re marked with matching arrows).  \*The angles are corresponding. | Given steps:  \*The lines are parallel (it says so, or they’re marked with matching arrows).  \*The angles are alternate exterior. | Given steps:  \*The lines are parallel (it says so, or they’re marked with matching arrows).  \*The angles are alternate interior. | Given steps:  \*The lines are parallel (it says so, or they’re marked with matching arrows).  \*The angles are same side interior. |
| The resulting step:  The angles are congruent. | The resulting step:  The angles are congruent. | The resulting step:  The angles are congruent. | The resulting step:  The angles add to equal 180˚ |
| EXAMPLE:     |  |  | | --- | --- | |  | Given | | Corr. | Given | |  | Corr. Post. | |  |  | | EXAMPLE:     |  |  | | --- | --- | |  | Given | | Alt. Ext. | Given | |  | Alt. Ext. Thm. | | EXAMPLE:     |  |  | | --- | --- | |  | Given | | Alt. Int. | Given | |  | Alt. Int. Thm. | | EXAMPLE:     |  |  | | --- | --- | |  | Given | | S.S. Int. | Given | |  | S.S. Int. Thm. | |

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| 9. | |  | 10. | |
| Given:      Prove: | |  | Given:      Prove: | |
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|  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
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| 11. | |  | 12. | |
| Given:      Prove: | |  | Given:      Prove: | |
|  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
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**--------PROOF REVIEW: ----------------------------------------------------------------------------------------------------------------------**

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| Write your own proof that uses the setup shown on the right. | Given: are a linear pair. and    Prove: | |
|  | Statements | Reasons |
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