Proving Lines Parallel Using Converse (backwards) Properties

So far, we have depended on having parallel lines in order to prove angle relationships. Now, we will do the opposite. We will depend on angle relationships to prove that the lines are parallel.

The new properties are:

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| **Converse of the**Corresponding Angles Postulate | **Converse of the**Alternate Exterior Angles Theorem | **Converse of the**Alternate Interior Angles Theorem | **Converse of the**Same Side Interior Angles Theorem |
| Setup steps:\*The angles are **corresponding**\* The angles are **congruent** | Setup steps:\*The angles are **alternate exterior**\* The angles are **congruent** | Setup steps:\*The angles are **alternate interior**\*The angles are **congruent** | Setup steps:\*The angles are **same side interior**\* The angles **add to equal 180˚** |
| The resulting step:The lines are **parallel** | The resulting step:The lines are **parallel** | The resulting step:The lines are **parallel**  | The resulting step:The lines are **parallel** |
| EXAMPLE:

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| $$∠5 \& ∠7 are$$Corr. $∠s$ | Given |
| $$∠5≅∠7$$ | Given |
| $$a||b$$ | Converse Corr. $∠s $Post. |
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 | EXAMPLE:

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| $$∠5 \& ∠4 are$$Alt. Ext. $∠s$ | Given |
| $$∠5≅∠4$$ | Given |
| $$a||b$$ | Converse Alt. Ext. $∠s $Thm. |

 | EXAMPLE:

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| $$∠ 2 \& ∠7 are$$Alt. Int. $∠s$ | Given |
| $$∠2≅∠7$$ | Given |
| $$a||b$$ | Converse Alt. Int. $∠s $Thm. |

 | EXAMPLE:

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| $$∠6 \& ∠7 are$$S.S. Int. $∠s$ | Given |
| $$m∠6+m∠7=180˚$$ | Given |
| $$a||b$$ | Converse S.S. Int. $∠s $Thm. |

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Fill in the blanks.

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| 1. |  | 2. |
| Given: $∠5≅∠3$ Prove: $c||d$ |  | Given:$ m∠4+m∠5=180˚$ Prove: $c||d$ |
| $$∠5 \& ∠3 are \\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$∠4 \& ∠5 are \\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$∠5≅∠3$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$m∠4+m∠5=180˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$c||d$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$c||d$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

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| 3. |  | 4. |
| Given:$ ∠2≅∠8$ Prove: $c||d$ |  | Given:$ ∠2≅∠6$ Prove: $c||d$ |
| $$∠2 \& ∠8 are \\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$∠2 \& ∠6 are \\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$∠2≅∠8$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$∠2≅∠6$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$c||d$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$c||d$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |



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| 5. |  | 6. |
| Given: $ ∠3 \& ∠7$ are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angles  and $m∠3+m∠7=180˚$ Prove: $f||g$ |  | Given: $ ∠6 \& ∠8$ are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angles  and $∠6≅∠8$ Prove: $f||g$ |
| $$m∠3+m∠7=180˚$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$∠6 \& ∠8 are \\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$∠3 \& ∠7 are \\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$∠6≅∠8$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$f||g$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$f||g$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

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| 7. |  | 8. |
| Given: $ ∠6 \& ∠7$ are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angles  and $∠6≅∠7$ Prove: $f||g$ |  | Given: $ ∠3 \& ∠2$ are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angles  and$ ∠3≅∠2$Prove: $f||g$ |
| $$∠6≅∠7$$$$∠6 \& ∠7 are \\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$∠3≅∠2$$$$∠3 \& ∠2 are \\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$f||g$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$f||g$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

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| 9. |  | 10. |
| Given: $ ∠5 \& ∠7$ are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angles  and $∠5≅∠7$Prove: $f||g$ |  | Given: $ ∠6 \& ∠2$ are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angles  and $m∠6+m∠2=180˚$ Prove: $f||g$ |
| $$∠5≅∠7$$$$∠5 \& ∠7 are \\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$m∠6+m∠2=180˚$$$$∠6 \& ∠2 are \\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$f||g$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$f||g$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

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| 11. |  | 12. |
| Given: $ ∠1 \& ∠4$ are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angles  and $∠1≅∠4$Prove: $f||g$ |  | Given: $ ∠5 \& ∠8$ are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angles  and $∠5≅∠8$ Prove: $f||g$ |
| $$∠1≅∠4$$$$∠1 \& ∠4 are \\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$∠5≅∠8$$$$∠5 \& ∠8 are \\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| $$f||g$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | $$f||g$$ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

13. What is the difference between the Corresponding Angles Postulate and the **Converse** of the Corresponding Angles Postulate? How do you know which to use, assuming you’re working with corresponding angles?

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