Parallelogram Proofs and Problems

**Definition:** A parallelogram is a quadrilateral with both pairs of opposite sides parallel.

**Example 1:** Given: ▭ABCD is a parallelogram.

Prove: AB ≅ CD and BC ≅ DA.

|  |  |
| --- | --- |
| **Statement** | **Reason** |
| 1. ABCD is a parallelogram
 | 1.  |
| 2.  | 2. Definition of a parallelogram |
| 1. ∠1 ≅ ∠4, ∠3 ≅ ∠2
 | 3. |
| 4.  | 4. |
| 5. ∆ABC ≅ ∆CDA | 5. |
| 6.  | 6. CPCTC |

**Example 2:** Given: ▭ABCD is a parallelogram.

Prove: ∠B ≅∠D

|  |  |
| --- | --- |
| **Statement** | **Reason** |
| 1. ABCD is a parallelogram
 | 1.  |
| 2.  | 2.  |
|  | 3. |
| 4.  | 4. |
| 5.  | 5. |
| 6.  | 6.  |

**Example 3:** Given: ▭ABCD is a parallelogram.

 Prove: AC and BD bisect each other at E.

|  |  |
| --- | --- |
| **Statement** | **Reason** |
| 1. ABCD is a parallelogram | 1. Given |
| 2.  | 2.  |
| 3.  | 3. |
| 4.  | 4. |
| 5.  | 5. ASA |
| 6.  | 6.  |
| 7.  | 7. Definition of segment bisector |

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| Properties of Parallelograms – use when GIVEN a pg. |
| Sides | Definition of Parallelogram: A **parallelogram** is a quadrilateral with both pairs of opposite sides parallel.  | http://www.mathplanet.com/Oldsite/media/44000/parallelogram_499x300.jpg |
| If a quadrilateral is a parallelogram, the 2 pairs of opposite sides are congruent. | http://www.mathplanet.com/Oldsite/media/44000/parallelogram_499x300.jpg |
| Angles | If a quadrilateral is a parallelogram, the 2 pairs of opposite angles are congruent. | http://www.mathplanet.com/Oldsite/media/44000/parallelogram_499x300.jpg |
| If a quadrilateral is a parallelogram, the consecutive angles are supplementary. | http://www.mathplanet.com/Oldsite/media/44000/parallelogram_499x300.jpg |
| Diagonals | If a quadrilateral is a parallelogram, the diagonals bisect each other. | http://www.mathplanet.com/Oldsite/media/44000/parallelogram_499x300.jpg |

**Example 4:** For what values of x and y must each figure be a parallelogram?



1.
2.



1.
2.

****

1.
2.

**DAY 2: HOMEWORK**

Use Parallelogram ABCD shown. Determine whether each of the statements is TRUE or FALSE. EXPLAIN your reasoning.



1. 



3.



4.

5.



6.





|  |  |
| --- | --- |
| **Statement** | **Reason** |
|  | 1.  |
| 2.  | 2.  |
|  | 3. |



|  |  |
| --- | --- |
| **Statement** | **Reason** |
|  | 1.  |
| 2.  | 2.  |
|  | 3. |
| 4.  | 4. |