Math 3 8.3 Parallelograms Unit 8

*SWBAT prove a figure to be a parallelogram and solve for variables in a parallelogram.*

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| Properties of Parallelograms |
| Sides | 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 |
| If a quadrilateral is a parallelogram and one angle is a right angle, then all angles are right angles. | 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 |
| If a quadrilateral is a parallelogram, the diagonals form two congruent triangles. | http://www.mathplanet.com/Oldsite/media/44000/parallelogram_499x300.jpg |

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

Prove: AB = CD and BC = DA.

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| **Statement** | **Reason** |
| 1. ABCD is a parallelogram
 | 1.  |
| 2.  | 2. Definition of a parallelogram |
| 1. <1 = <4, <3 = <2
 | 3. |
| 4. AC = AC | 4. |
| 5. ∆ABC = ∆CDA | 5. |
| 6.  | 6. CPCTC |

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

 Prove: AC and BD bisect each other at E.

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| **Statement** | **Reason** |
| 1. ABCD is a parallelogram | 1. Given |
| 2. AB || DC | 2.  |
| 3. <1 = <4, <2 = <3 | 3. |
| 4. AB = DC | 4. |
| 5.  | 5. ASA |
| 6. AE = CE, BE = DE | 6.  |
| 7.  | 7. Definition of bisector |

**Example 3:** For what values of x and y must each figure be a parallelogram?



1.
2.



1.
2.

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1.
2.