5.7. Honors Geometry

DATE: 12/16

Target 4A. Use theorems postulates, and/or definitions to prove theorems about parallelograms

Methods of proving special quadrilaterals:

PARALLELOGRAM

1 If both pairs of opposite sides of a quadrilateral are parallel, then the quadrilateral is a parallelogram (reverse of the definition).

2 If both pairs of opposite sides of a quadrilateral are congruent, then the quadrilateral is a parallelogram (converse of a property).

3 If one pair of opposite sides of a quadrilateral are both parallel and congruent, then the quadrilateral is a parallelogram.

4 If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram (converse of a property).

5 If both pairs of opposite angles of a quadrilateral are congruent, then the quadrilateral is a parallelogram (converse of a property).

RHOMBUS

1 If a parallelogram contains a pair of consecutive sides that are congruent, then it is a rhombus (reverse of the definition).

2 If either diagonal of a parallelogram bisects two angles of the parallelogram, then it is a rhombus.

3 If the diagonals of a quadrilateral are perpendicular bisectors of each other, then the quadrilateral is a rhombus.

RECTANGLE

1 If a parallelogram contains at least one right angle, then it is a rectangle (reverse of the definition).

2 If the diagonals of a parallelogram are congruent, then the parallelogram is a rectangle.

3 If all four angles of a quadrilateral are right angles, then it is a rectangle.

SQUARE

If a quadrilateral is both a rectangle and a rhombus, then it is a square (reverse of the definition).

KITE

1 If two disjoint pairs of consecutive sides of a quadrilateral are congruent, then it is a kite (reverse of the definition).

2 If one of the diagonals of a quadrilateral is the perpendicular bisector of the other diagonal, then the quadrilateral is a kite.

TRAPEZOID

1 If a quadrilateral has exactly one pair of parallel sides, then it is a trapezoid (reverse of the definition).

ISOSCELES TRAPEZOID

1 If the nonparallel sides of a trapezoid are congruent, then it is isosceles (reverse of the definition).

2 If the lower or the upper base angles of a trapezoid are congruent, then it is isosceles.

3 If the diagonals of a trapezoid are congruent, then it is isosceles.