Chapter Audio Summary for McDougal Littell
Geometry

Chapter 6 Quadrilaterals

In Chapter 6 you used the properties of parallelograms and algebra to solve problems involving side lengths and angle measures. You used the distance and slope formulas with coordinate geometry to show that figures are parallelograms. You also used the properties of trapezoids and kites. You identified special quadrilaterals based on limited information. Finally, you applied formulas for the areas of various geometric figures.

Turn to the lesson-by-lesson Chapter Review that starts on p. 382 of the textbook.

Lesson 6.1 Polygons

Important words to know are: *polygon, sides of a polygon, vertex, vertices, convex, nonconvex, concave, equilateral polygon, equiangular polygon, regular polygon,* and *diagonal of a polygon.*

The first goal of Lesson 6.1 is to identify, name, and describe polygons. In the diagram, hexagon *ABCDEF* is convex and equilateral. It is not regular because it is not both equilateral and equiangular. $\overline{AD}$ is a diagonal of *ABCDEF*. The sum of the measures of the interior angles of quadrilateral is $360°$.

The word *equilateral* describes a regular polygon by its side lengths; the word *equiangular* describes a regular polygon by its angle measures.

The second goal of Lesson 6.1 is to use the sum of the measures of the interior angles of a quadrilateral. That sum is always 360°.

Now try Exercises 1 through 5. If you need help, go to the worked-out Examples on pages 322 through 324.

Lesson 6.2 Properties of Parallelograms

An important word to know is: *parallelogram.*

The first goal of Lesson 6.2 is to use some properties of parallelograms. In the diagram, quadrilateral *JKLM* is a parallelogram. Opposite sides, such as $\overline{JK}$ and $\overline{ML}$, are parallel and congruent. Opposite angles, such as $\angle J$ and $\angle L$, are congruent. Consecutive angles, such as $\angle J$ and $\angle K$, are supplementary. The diagonals $\overline{JL}$ and $\overline{MK}$ bisect each other.

Now try Exercises 6 through 8. If you need help, go to the worked-out Examples on pages 331 through 333.

Lesson 6.3 Proving Quadrilaterals are Parallelograms

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The first goal of Lesson 6.3 is to prove that a quadrilateral is a parallelogram. To prove that a quadrilateral *PQRS* is a parallelogram, start with the given information, $\overline{PQ} \cong \overline{RS}$ and $\overline{PS} \cong \overline{RQ}$. Since both pairs of opposite sides are congruent, *PQRS* must be a parallelogram.

The Concept Summary box at the bottom of page 340 lists different ways to prove that a quadrilateral is a parallelogram.

The second goal of Lesson 6.3 is to use coordinate geometry to prove sides of a figure are parallel or congruent.

Now try Exercises 9 through 12. If you need help, go to the worked-out Examples on pages 339 through 341.

Lesson 6.4 Rhombuses, Rectangles, and Squares

Important words to know are: *rhombus, rectangle,* and *square.*

The first goal of Lesson 6.4 is to use properties of sides and angles of rhombuses, rectangles, and squares. In the diagram, *ABCD* can be classified as a rhombus because it has 4 congruent sides. The diagonals of a rhombus are perpendicular and each one bisects a pair of opposite angles. *ABCD* can also be classified as a rectangle because it has 4 right angles. The diagonals of a rectangle are congruent. *ABCD* can also be classified as a square since it has 4 congruent sides and 4 right angles.

Remember that the diagonals of rectangles and squares are always congruent.

Now try Exercises 13 through 15. If you need help, go to the worked-out Examples on pages 347 through 350.

Lesson 6.5 Trapezoids and Kites

Important words to know are: *trapezoid, bases of a trapezoid, base angles of a trapezoid, legs of a trapezoid, isosceles trapezoid, midsegment of a trapezoid,* and *kite.*

The first goal of Lesson 6.5 is to use properties of trapezoids. In the example, *EFGH* is a trapezoid because it has exactly one pair of parallel sides, *EF* and *HG*. *ABCD* is an isosceles trapezoid because its base angles are congruent, and its diagonals *AC* and *BD* are congruent. *JKLM* is a kite because its diagonals are perpendicular, and exactly one pair of opposite angles, angles *K* and *M,* are congruent.

Now try Exercises 16 through 18. If you need help, go to the worked-out Examples on pages 356 through 358.

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Lesson 6.6 Special Quadrilaterals

The first goal of Lesson 6.6 is to identify special quadrilaterals based on limited information.

The second goal of Lesson 6.6 is to prove that a quadrilateral is a special type of quadrilateral, such as a rhombus or a trapezoid. To prove that a quadrilateral is a rhombus, you can show that it has four congruent sides or that it is a parallelogram whose diagonals are perpendicular. You can also show that each diagonal bisects a pair of opposite angles.

Now try Exercises 19 through 22. If you need help, go to the worked-out Examples on pages 364 through 366.

Lesson 6.7 Areas of Triangles and Quadrilaterals

The first goal of Lesson 6.7 is to find the areas of squares, rectangles, parallelograms, and triangles. To find the area of a parallelogram or triangle, you can use any side as the base. Be sure you measure the height of an altitude that is perpendicular to the base you have chosen. In the example, the area of *ABCD* is the product of the base, 5, times the height, 4. So the area is 20.

The second goal of Lesson 6.7 is to find the areas of trapezoids, kites, and rhombuses. In the Example, the area of *JKLM* is the product of half the height times the sum of the bases. The height is 7, and the sum of the bases is 10 + 6, or 16. So the area is $\frac{1}{2}$•7•16, or 56.

Now try Exercises 23 through 25. If you need help, go to the worked-out Examples on pages 373 through 375.