Chapter Audio Summary for McDougal Littell
Geometry

Chapter 4 Congruent Triangles

In Chapter 4 you classified triangles and proved two triangles congruent. You used congruent triangles in real-life problems. You used congruent triangles in writing proofs and proving that constructions are valid. You used properties of isosceles, equilateral, and right triangles. Finally, you learned how to place geometric figures in a coordinate plane to prove statements about the figures.

Turn to the lesson-by-lesson Chapter Review that starts on p. 252 of the textbook.

Lesson 4.1 Triangles and Angles

Important words to know are: *equilateral triangle, isosceles triangle, scalene triangle, acute triangle, equiangular triangle, right triangle, obtuse triangle, vertex of a triangle, adjacent sides of a triangle, legs of a right triangle, hypotenuse, legs of an isosceles triangle, base of an isosceles triangle, interior angle, exterior angle,* and *corollary.*

The first goal of Lesson 4.1 is to classify triangles by their sides and angles. Note that an equilateral triangle is also isosceles and acute.

The second goal of Lesson 4.1 is to find angle measures in triangles. You can apply the Triangle Sum Theorem to find unknown angle measures in triangles. $m\angle A + m\angle B + m\angle C = 180°$. Substitute the known measures 92° and 40°, and simplify. So $m\angle A = 48°$.

For help with solving equations, see pages 789 and 790.

Now try Exercises 1 through 6. If you need help, go to the worked-out Examples on pages 194 through 197.

Lesson 4.2 Congruence and Triangles

Important words to know are: *congruent, corresponding angles,* and *corresponding sides.*

The first goal of Lesson 4.2 is to identify congruent figures and corresponding parts. When two figures are congruent, their corresponding sides and corresponding angles are congruent. The diagram shows the corresponding sides and corresponding angles of $\triangle ABC$ and $\triangle XYZ$. Notice that single, double, and triple arcs are used to show congruent angles.

The second goal of Lesson 4.2 is to prove that two triangles are congruent.

Now try Exercises 7 and 8. If you need help, go to the worked-out Examples on pages 202 through 204.

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Lessons 4.3 and 4.4 Proving Triangles are Congruent: SSS, SAS, ASA, and AAS

The first goal of Lessons 4.3 and 4.4 is to prove that triangles are congruent using the SSS, SAS, ASA, and AAS Congruence Postulates. The first Example shows that because all corresponding sides are congruent, $\Delta JKL \cong \Delta MNP$ by the SSS Congruence Postulate. In the second Example, $\Delta DEF \cong \Delta ACB$ by the SAS Congruence Postulate. To use SAS, the *included* angles must be congruent, as they are in this Example.

The second goal of Lessons 4.3 and 4.4 is to use congruence postulates in real-life problems, such as bracing a structure.

Now try Exercises 9 through 11. If you need help, go to the worked-out Examples on pages 212 through 215 and pages 221 and 222.

Lesson 4.5 Using Congruent Triangles

The first goal of Lesson 4.5 is to use congruent triangles to plan and write proofs. In the Example, if you can show that triangles are congruent, you can use the fact that corresponding parts are congruent in your proof. First show that $\Delta PRQ \cong \Delta PRS$ by the SSS Congruence Postulate. Because corresponding parts of congruent triangles are congruent, you can conclude that $\angle PRQ \cong \angle PRS$. These congruent angles form a linear pair, so the measure of each angle is 90°, and $\overline{PR} \perp \overline{QS}$.

The second goal of Lesson 4.5 is to use congruent triangles to prove constructions are valid.

Now try Exercises 12 and 13. If you need help, go to the worked-out Examples on pages 229 through 231.

Lesson 4.6 Isosceles, Equilateral, and Right Triangles

Important words to know are: *base angle* and *vertex angle.*

The first goal of Lesson 4.6 is to use properties of isosceles and equilateral triangles. According to the Base Angles Theorem, if two sides of a triangle are congruent, then the angles opposite them are congruent. So, $\angle B \cong \angle C$, and they are complementary. The measure of each angle is 45°, so $x = 45$.

The second goal of Lesson 4.6 is to use properties of right triangles. Remember, before you can use the Hypotenuse Leg Congruence Theorem in a proof, you need to prove that the triangles are right triangles.

Now try Exercises 14 through 17. If you need help, go to the worked-out Examples on pages 237 and 238.

Lesson 4.7 Triangles and Coordinate Proof

Important words to know are: *coordinate proof.*

The first goal of Lesson 4.7 is to place geometric figures in a coordinate plane. You can use a coordinate proof to prove that ΔOPQ is isosceles. First, use the distance formula to show that the length of OP equals $\sqrt{(2-0)^2 + (3-0)^2}$, or $\sqrt{13}$. The length QP equals $\sqrt{(2-4)^2 + (3-0)^2}$, or $\sqrt{13}$. Because the lengths of two sides of the triangle are equal, the triangle is isosceles.

The second goal of Lesson 4.7 is to write a coordinate proof. A coordinate proof uses coordinates in a plane to prove conclusions.

Now try Exercise 18. If you need help, go to the worked-out Examples on pages 243 through 246.