Chapter Audio Summary for McDougal Littell
Geometry

Chapter 8 Similarity

In Chapter 8, you simplified ratios, solved proportions, and used properties of proportions to solve real-life problems. Then you worked with similar polygons and similar triangles. You learned to prove that two triangles are similar. You then used similar triangles to solve indirect measurement problems. You studied proportionality theorems. Finally, you identified dilations.

Turn to the lesson-by-lesson Chapter Review that starts on p. 516 of the textbook.

Lesson 8.1 Ratio and Proportion

Important terms to know are: *ratio, proportion, extremes,* and *means.*

The first goal of Lesson 8.1 is to find and simplify the ratio of two numbers. The Example shows how to solve a proportion by finding the value of the variable. The proportion is $\frac{x}{12}=\frac{x+6}{30}$. Use the cross product property to find $30x=12(x+6)$. Then use the distributive property to find $30x=12x+72$. Subtract 12*x* from each side and then divide each side by 18 to find $x=4$.

Remember that the numerator and denominator of a ratio must be measured in the same units.

The second goal of Lesson 8.1 is to use proportions to solve real-life problems, such as computing the length of a painting.

Now try Exercises 1 through 4. If you need help, go to the worked-out Examples on pages 457 through 460.

Lesson 8.2 Problem Solving in Geometry with Proportions

An important term to know is: *geometric mean.*

The first goal of Lesson 8.2 is to use properties of proportions to tell whether a statement is true.

The second goal of Lesson 8.2 is to use proportions to solve real-life problems. You can use the proportion $\frac{47}{6}=\frac{3,760,000}{x}$ to find the population of Wyoming. Use cross products to find $47x=22,560,000$. Divide both sides by 47 to find the population of Wyoming was about 480,000.

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When setting up proportions with different units, the numerators should have the same units and the denominators should have the same units.

Now try Exercises 5 and 6. If you need help, go to the worked-out Examples on pages 465 through 467.

Lesson 8.3 Similar Polygons

Important words to know are: *similar polygons* and *scale factor*.

The first goal of Lesson 8.3 is to identify similar polygons, polygons whose angles are congruent and whose corresponding side lengths are proportional. If you have trouble determining the corresponding sides of similar figures, try tracing one of the figures and rotating the tracing to make the figures easier to compare.

In the Example, the two parallelograms are similar because their corresponding angles are congruent and their corresponding sides are proportional. You know that the sides are proportional because the ratio of each of the corresponding sides is the same: 3/4. This ratio is also known as the scale factor.

Now try Exercises 7 through 9. If you need help, go to the worked-out Examples on pages 473 through 475.

Lesson 8.4 Similar Triangles

The first goal of Lesson 8.4 is to identify similar triangles. The Example shows two noncongruent triangles, each with a 55° angle and a 90° angle. By the Angle-Angle Similarity postulate, the triangles are similar.

Remember that when using the AA Similarity Postulate, you do not need to show that the ratios of corresponding side lengths are equal.

Now try Exercises 10 through 12. If you need help, go to the worked-out Examples on pages 480 through 482.

Lesson 8.5 Proving Triangles are Similar

The first goal of Lesson 8.5 is to use similarity theorems to prove that two triangles are similar. You can use the Side-Side-Side (SSS) Similarity Theorem and the Side-Angle-Side (SAS) Similarity Theorem to prove that triangles are similar. In the Examples, three sides of ΔJKL are proportional to three sides of ΔMNP, so the triangles are similar.

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Remember that you can trace triangles on separate sheets of paper and then rotate them so that their orientation is the same.

Now try Exercises 13 and 14. If you need help, go to the worked-out Examples on pages 488 through 491.

Lesson 8.6 Proportions and Similar Triangles

The first goal of Lesson 8.6 is to use proportionality theorems to calculate segment lengths. Look at ΔJKL in the Examples. You can see that $\frac{JN}{NK}=\frac{12}{20}=\frac{3}{5}$ and that $\frac{JM}{ML}=\frac{15}{25}=\frac{3}{5}$. Because *NM* divides two sides of the triangle proportionally, *NM* is parallel to the third side, *KL*.

Now try Exercises 15 through 17. If you need help, go to the worked-out Examples on pages 498 through 501.

Lesson 8.7 Dilations

Important words to know are: *dilation, reduction,* and *enlargement.*

The first goal of Lesson 8.7 is to identify dilations. If $0 < k < 1$, where *k* is the scale factor, the dilation is a reduction. If $k>1$, it is an enlargement. In the Example, the blue triangle is mapped onto the red triangle by a dilation with center *C*. The scale factor is 1/5, which is between 0 and 1, so the dilation is a reduction. Remember that the image in a reduction is smaller than the preimage.

The second goal of Lesson 8.7 is to use dilations to solve problems, such as creating a real-life perspective drawing.

Now try Exercise 18. If you need help, go to the worked-out Examples on pages 506 through 508.