

Chapter Audio Summary for McDougal Littell *Geometry*

Chapter 3 Perpendicular and Parallel Lines

In Chapter 3 you found out about the relationships between lines and angles on a plane and in space. You studied the angles formed when two lines are intersected by a transversal, and learned how to write and use flow proofs. Then you applied properties of parallel lines to solve real-life problems. You used a straightedge and a compass to construct parallel lines. Finally, you used slope to identify parallel and perpendicular lines in a coordinate plane.

Turn to the lesson-by-lesson Chapter Review that starts on p. 180 of the textbook.

Lesson 3.1 Lines and Angles

Important words to know are: *parallel lines*, *skew lines*, *parallel planes*, *transversal*, *corresponding angles*, *alternate interior angles*, *alternate exterior angles*, *consecutive interior angles*, and *same side interior angles*.

The first goal of Lesson 3.1 is to identify relationships between lines. Remember that two lines are parallel lines if they are coplanar and do not intersect.

The second goal of Lesson 3.1 is to identify angles formed by transversals. In the diagram, $j \parallel k$ [read “is parallel to”] k , h is a transversal, and $h \perp k$. Note that $\angle 1$ and $\angle 5$ are corresponding angles. $\angle 3$ and $\angle 6$ are alternate interior angles. $\angle 1$ and $\angle 8$ are alternate exterior angles. $\angle 4$ and $\angle 6$ are consecutive interior angles.

Now try Exercises 1 through 5. If you need help, go to the worked-out Examples on pages 129 through 131.

Lesson 3.2 Proof and Perpendicular Lines

Important words to know are: *flow proof*.

The first goal of Lesson 3.2 is to write different types of proofs. A flow proof uses arrows to show the flow of the logical argument. For each step in the flow proof, you need to give a reason. The reason for the first step would be “Given.”

When writing any type of proof, it may help to write out a plan first.

Now try Exercise 6. If you need help, go to the worked-out Examples on pages 136 through 138.

Lesson 3.3 Parallel Lines and Transversals

Chapter Audio Summary for McDougal Littell

Geometry

The first goal of Lesson 3.3 is to prove and use results about parallel lines and transversals. The example tells you that, in the diagram, $m\angle 1 = 75^\circ$. By the Alternate Exterior Angles Theorem, $m\angle 8 = m\angle 1 = 75^\circ$. Because $\angle 8$ and $\angle 7$ are a linear pair, $m\angle 8 + m\angle 7 = 180^\circ$. So, $m\angle 7 = 180^\circ - 75^\circ = 105^\circ$.

Remember that when you prove a theorem you may use any previously proven theorem, such as the Alternate Exterior Angles Theorem, but you may not use the one you're proving.

The second goal of Lesson 3.3 is to use properties of parallel lines to solve real-life problems, such as estimating Earth's circumference.

Now try Exercises 7 through 10. If you need help, go to the worked-out Examples on pages 144 and 145.

Lesson 3.4 Proving Lines are Parallel

The first goal of Lesson 3.4 is to prove that two lines are parallel. In the Example, you are given that $m\angle 3 = 125^\circ$ and $m\angle 6 = 125^\circ$. From the diagram, you know that $\angle 3$ and $\angle 6$ are alternate exterior angles. So l and m are parallel by the Alternate Exterior Angles Converse.

The second goal of Lesson 2.4 is to use properties of parallel lines to solve real-life problems, such as proving that prehistoric mounds are parallel.

Now try Exercises 11 and 12. If you need help, go to the worked-out Examples on pages 151 and 152.

Lesson 3.5 Using Properties of Parallel Lines

The first goal of Lesson 3.5 is to use properties of parallel lines in real-life situations, such as building a CD rack. Remember that two coplanar lines that are perpendicular to the same line are perpendicular to each other. In the diagram, l and m are coplanar and perpendicular to the same line, so l and m are parallel. Then, because l and m are parallel and m and n are parallel, l and n are parallel.

The second goal of Lesson 3.5 is to construct parallel lines using a straightedge and compass.

Now try Exercises 13 through 16. If you need help, go to the worked-out Examples on pages 157 and 158.

Chapter Audio Summary for McDougal Littell *Geometry*

Lesson 3.6 Parallel Lines in the Coordinate Plane

The first goal of Lesson 3.6 is to find slopes of lines and use slope to identify parallel lines in a coordinate plane.

You may want to review finding slope on pages 165 and 166. Note that you can either use the slope formula or count units on a graph to find slope.

The second goal of Lesson 3.6 is to write equations of parallel lines in a coordinate plane. In the examples, the slopes of l_1 and l_2 are the same (2), l_1 and l_2 are parallel. To find the equation for Line 2, substitute 2 for the slope m and (5, 3) for the coordinates x and y . The equation for Line 2 is $y = 2x - 7$.

Now try Exercises 17 through 20. If you need help, go to the worked-out Examples on pages 165 through 167.

Lesson 3.7 Perpendicular Lines in the Coordinate Plane

The first goal of Lesson 3.7 is to use slope to identify perpendicular lines in a coordinate plane. In a coordinate plane, two nonvertical lines are perpendicular if and only if the product of their slopes is -1 . In the Example, the slope of line j is 3, and the slope of line k is $-\frac{1}{3}$. Their product is $3\left(-\frac{1}{3}\right)$, or -1 , so lines j and k are perpendicular.

The second goal of Lesson 3.7 is to write equations of perpendicular lines.

Now try Exercises 21 through 24. If you need help, go to the worked-out Examples on pages 172 through 174.