CHAPTER 3 Chapter Review

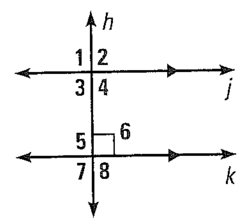
VOCABULARY

- parallel lines, p. 129
- skew lines, p. 129
- parallel planes, p. 129
- transversal, p. 131
- corresponding angles, p. 131
- alternate interior angles, p. 131
- alternate exterior angles, p. 131
- consecutive interior angles, p. 131
- same side interior angles, p. 131
- flow proof, p. 136

3.1 LINES AND ANGLES

Examples on pp. 129–131

EXAMPLES In the figure, $j \parallel k$, h is a transversal, and $h \perp k$.



$\angle 1$ and $\angle 5$ are corresponding angles.

$\angle 3$ and $\angle 6$ are alternate interior angles.

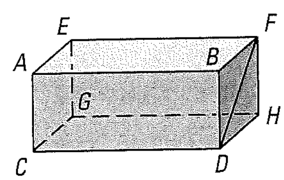
$\angle 1$ and $\angle 8$ are alternate exterior angles.

$\angle 4$ and $\angle 6$ are consecutive interior angles.

Complete the statement. Use the figure above.

1. $\angle 2$ and $\angle 7$ are __?__ angles.
2. $\angle 4$ and $\angle 5$ are __?__ angles.

Use the figure at the right.



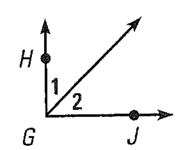
3. Name a line parallel to $\overleftrightarrow{DH}$.
4. Name a line perpendicular to $\overleftrightarrow{AE}$.
5. Name a line skew to $\overleftrightarrow{FD}$.

3.2 PROOF AND PERPENDICULAR LINES

Examples on pp. 136–138

EXAMPLE **GIVEN** ▶ $\angle 1$ and $\angle 2$ are complements.

PROVE ▶ $\overrightarrow{GH} \perp \overrightarrow{GJ}$



$\angle 1$ and $\angle 2$ are complements.
__?__

→ **$m\angle 1 + m\angle 2 = 90°$**
__?__

$m\angle 1 + m\angle 2 = m\angle HGJ$
__?__

→ **$m\angle HGJ = 90°$**
__?__

→ **$\angle HGJ$ is a right $\angle$.**
__?__

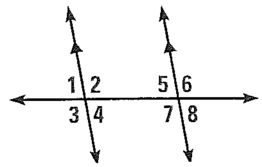
→ **$\overrightarrow{GH} \perp \overrightarrow{GJ}$**
__?__

6. Copy the flow proof and add a reason for each statement.

3.3 PARALLEL LINES AND TRANSVERSALS

Examples on pp. 143–145

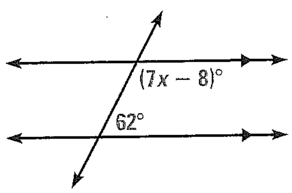
EXAMPLE In the diagram, $m\angle 1 = 75°$. By the Alternate Exterior Angles Theorem, $m\angle 8 = m\angle 1 = 75°$. Because $\angle 8$ and $\angle 7$ are a linear pair, $m\angle 8 + m\angle 7 = 180°$. So, $m\angle 7 = 180° - 75° = 105°$.



7. Find the measures of the other five angles in the diagram above.

Find the value of *x*. Explain your reasoning.

8.



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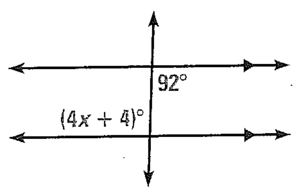

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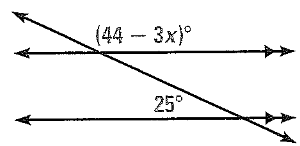


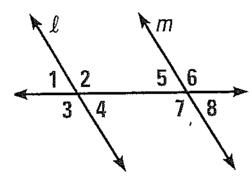
3.4 PROVING LINES ARE PARALLEL

Examples on pp. 150–152

EXAMPLE **GIVEN** ▶ $m\angle 3 = 125°$, $m\angle 6 = 125°$

PROVE ▶ $\ell \parallel m$

Plan for Proof: $m\angle 3 = 125° = m\angle 6$, so $\angle 3 \cong \angle 6$. So, $\ell \parallel m$ by the Alternate Exterior Angles Converse.



Use the diagram above to write a proof.

11. **GIVEN** ▶ $m\angle 4 = 60°$, $m\angle 7 = 120°$

PROVE ▶ $\ell \parallel m$

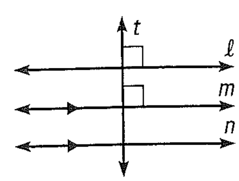
12. **GIVEN** ▶ $\angle 1$ and $\angle 7$ are supplementary.

PROVE ▶ $\ell \parallel m$

3.5 USING PROPERTIES OF PARALLEL LINES

Examples on pp. 157–159

EXAMPLE In the diagram, $\ell \perp t$, $m \perp t$, and $m \parallel n$. Because ℓ and m are coplanar and perpendicular to the same line, $\ell \parallel m$. Then, because $\ell \parallel m$ and $m \parallel n$, $\ell \parallel n$.



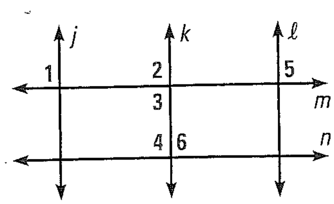
Which lines must be parallel? Explain.

13. $\angle 1$ and $\angle 2$ are right angles.

14. $\angle 3 \cong \angle 6$

15. $\angle 3$ and $\angle 4$ are supplements.

16. $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 5$

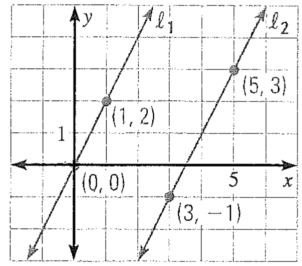


3.6 PARALLEL LINES IN THE COORDINATE PLANE

Examples on pp. 165–167

EXAMPLES slope of $\ell_1 = \frac{2-0}{1-0} = 2$

slope of $\ell_2 = \frac{3-(-1)}{5-3} = \frac{4}{2} = 2$



The slopes are the same, so $\ell_1 \parallel \ell_2$.

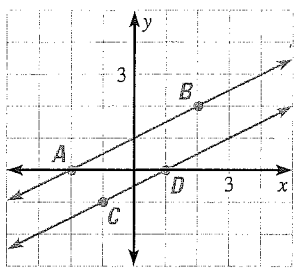
To write an equation for ℓ_2, substitute $(x, y) = (5, 3)$ and $m = 2$ into the slope-intercept form.

$y = mx + b$	Slope-intercept form.
$3 = (2)(5) + b$	Substitute 5 for x, 3 for y, and 2 for m.
$-7 = b$	Solve for b.

▶ So, an equation for ℓ_2 is $y = 2x - 7$.

Find the slope of each line. Are the lines parallel?

17.



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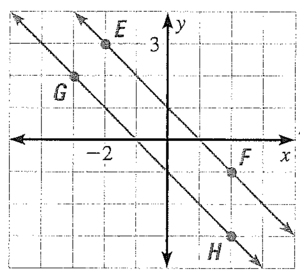

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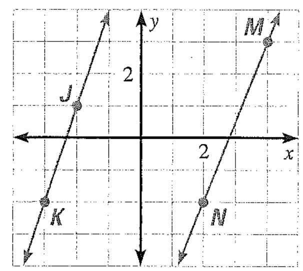


20. Find an equation of the line that is parallel to the line with equation $y = -2x + 5$ and passes through the point $(-1, -4)$.

3.7 PERPENDICULAR LINES IN THE COORDINATE PLANE

Examples on pp. 172–174

EXAMPLE The slope of line j is 3. The slope of line k is $-\frac{1}{3}$.

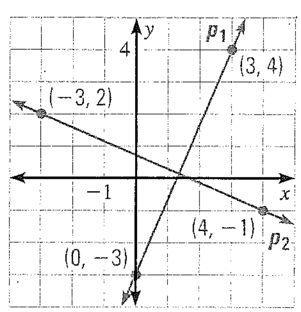
$3\left(-\frac{1}{3}\right) = -1$, so $j \perp k$.

In Exercises 21–23, decide whether lines p_1 and p_2 are perpendicular.

21. Lines p_1 and p_2 in the diagram.

22. p_1: $y = \frac{3}{5}x + 2$; p_2: $y = \frac{5}{3}x - 1$

23. p_1: $2y - x = 2$; p_2: $y + 2x = 4$



24. Line ℓ_1 has equation $y = -3x + 5$. Write an equation of line ℓ_2 which is perpendicular to ℓ_1 and passes through $(-3, 6)$.