

3.1 Exercises

Vocabulary and Core Concept Check

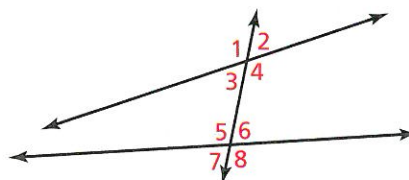
- COMPLETE THE SENTENCE** Two lines that do not intersect and are also not parallel are _____ lines.
- WHICH ONE DOESN'T BELONG?** Which angle pair does *not* belong with the other three? Explain your reasoning.

$\angle 2$ and $\angle 3$

$\angle 4$ and $\angle 5$

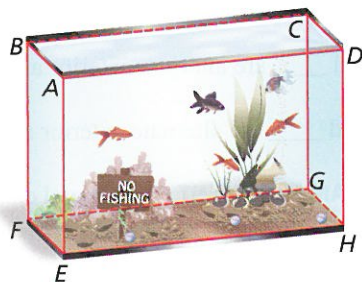
$\angle 1$ and $\angle 8$

$\angle 2$ and $\angle 7$



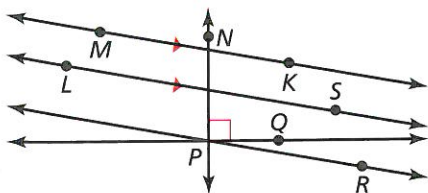
Monitoring Progress and Modeling with Mathematics

In Exercises 3–6, think of each segment in the diagram as part of a line. All the angles are right angles. Which line(s) or plane(s) contain point B and appear to fit the description? (See Example 1.)



- line(s) parallel to \overline{CD}
- line(s) perpendicular to \overline{CD}
- line(s) skew to \overline{CD}
- plane(s) parallel to plane CDH

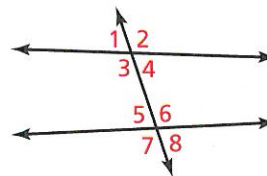
In Exercises 7–10, use the diagram. (See Example 2.)



- Name a pair of parallel lines.
- Name a pair of perpendicular lines.

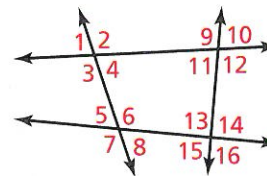
- Is $\overrightarrow{PN} \parallel \overrightarrow{KM}$? Explain.
- Is $\overrightarrow{PR} \perp \overrightarrow{NP}$? Explain.

In Exercises 11–14, identify all pairs of angles of the given type. (See Example 3.)



- corresponding
- alternate interior
- alternate exterior
- consecutive interior

USING STRUCTURE In Exercises 15–18, classify the angle pair as *corresponding*, *alternate interior*, *alternate exterior*, or *consecutive interior* angles.



- $\angle 5$ and $\angle 1$
- $\angle 6$ and $\angle 13$
- $\angle 11$ and $\angle 13$
- $\angle 2$ and $\angle 11$

ERROR ANALYSIS In Exercises 19 and 20, describe and correct the error in the conditional statement about lines.

19.



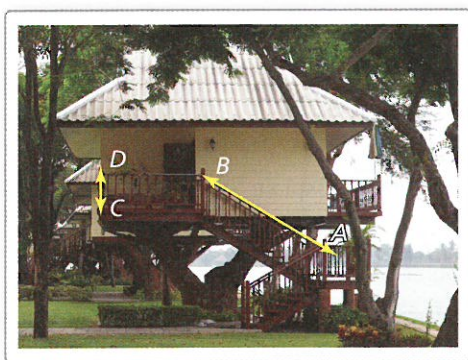
If two lines do not intersect, then they are parallel.

20.



If there is a line and a point not on the line, then there is exactly one line through the point that intersects the given line.

21. **MODELING WITH MATHEMATICS** Use the photo to decide whether the statement is true or false. Explain your reasoning.



- The plane containing the floor of the tree house is parallel to the ground.
- The lines containing the railings of the staircase, such as \overline{AB} , are skew to all lines in the plane containing the ground.
- All the lines containing the balusters, such as \overline{CD} , are perpendicular to the plane containing the floor of the tree house.

22. **THOUGHT PROVOKING** If two lines are intersected by a third line, is the third line necessarily a transversal? Justify your answer with a diagram.

23. **MATHEMATICAL CONNECTIONS** Two lines are cut by a transversal. Is it possible for all eight angles formed to have the same measure? Explain your reasoning.

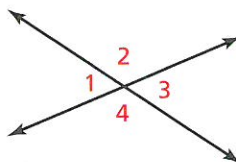
Maintaining Mathematical Proficiency

Reviewing what you learned in previous grades and lessons

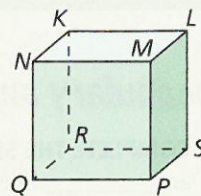
Use the diagram to find the measures of all the angles. (Section 2.6)

30. $m\angle 1 = 76^\circ$

31. $m\angle 2 = 159^\circ$

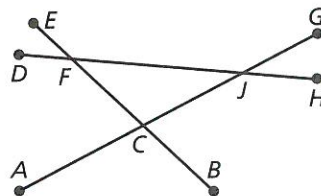


24. **HOW DO YOU SEE IT?** Think of each segment in the figure as part of a line.



- Which lines are parallel to \overleftrightarrow{NQ} ?
- Which lines intersect \overleftrightarrow{NQ} ?
- Which lines are skew to \overleftrightarrow{NQ} ?
- Should you have named all the lines on the cube in parts (a)–(c) except \overleftrightarrow{NQ} ? Explain.

In Exercises 25–28, copy and complete the statement. List all possible correct answers.



- $\angle BCG$ and ____ are corresponding angles.
- $\angle BCG$ and ____ are consecutive interior angles.
- $\angle FCJ$ and ____ are alternate interior angles.
- $\angle FCA$ and ____ are alternate exterior angles.
- MAKING AN ARGUMENT** Your friend claims the uneven parallel bars in gymnastics are not really parallel. She says one is higher than the other, so they cannot be in the same plane. Is she correct? Explain.

