

3.2 Exercises

Vocabulary and Core Concept Check

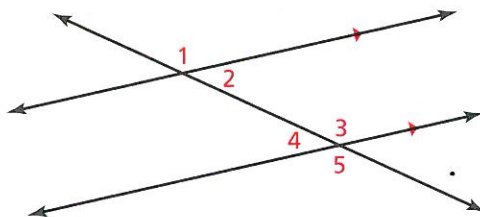
- WRITING** How are the Alternate Interior Angles Theorem (Theorem 3.2) and the Alternate Exterior Angles Theorem (Theorem 3.3) alike? How are they different?
- WHICH ONE DOESN'T BELONG?** Which pair of angle measures does *not* belong with the other three? Explain.

$m\angle 1$ and $m\angle 3$

$m\angle 2$ and $m\angle 4$

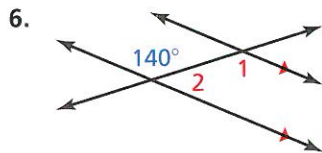
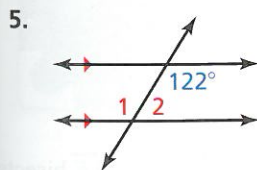
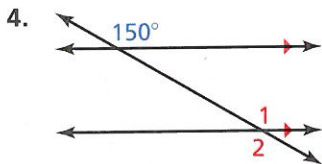
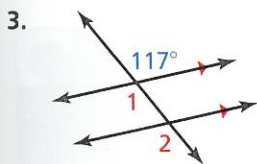
$m\angle 2$ and $m\angle 3$

$m\angle 1$ and $m\angle 5$

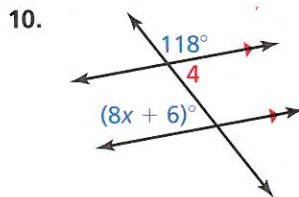
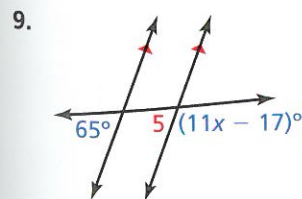
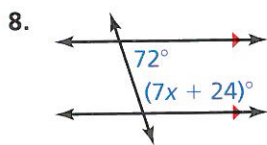
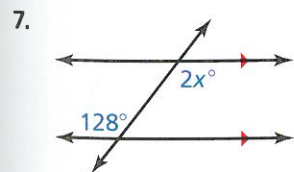


Monitoring Progress and Modeling with Mathematics

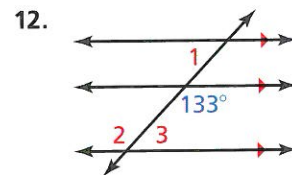
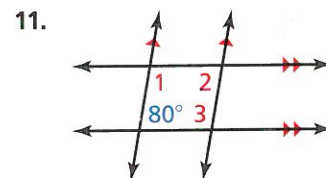
In Exercises 3–6, find $m\angle 1$ and $m\angle 2$. Tell which theorem you use in each case. (See Example 1.)



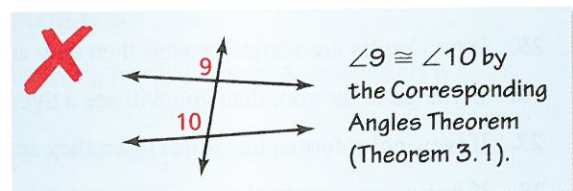
In Exercises 7–10, find the value of x . Show your steps. (See Examples 2 and 3.)



In Exercises 11 and 12, find $m\angle 1$, $m\angle 2$, and $m\angle 3$. Explain your reasoning.

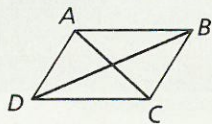


13. **ERROR ANALYSIS** Describe and correct the error in the student's reasoning.



14. HOW DO YOU SEE IT?

Use the diagram.



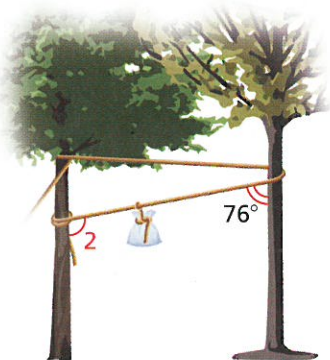
- Name two pairs of congruent angles when \overline{AD} and \overline{BC} are parallel. Explain your reasoning.
- Name two pairs of supplementary angles when \overline{AB} and \overline{DC} are parallel. Explain your reasoning.

PROVING A THEOREM In Exercises 15 and 16, prove the theorem. (See Example 4.)

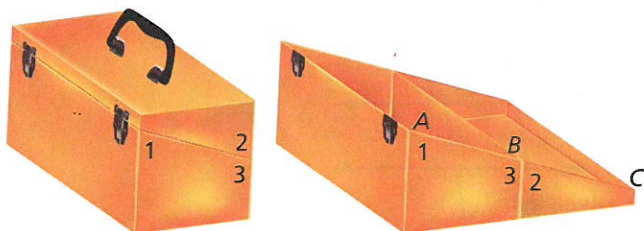
- Alternate Exterior Angles Theorem (Thm. 3.3)
- Consecutive Interior Angles Theorem (Thm. 3.4)

17. PROBLEM SOLVING

A group of campers tie up their food between two parallel trees, as shown. The rope is pulled taut, forming a straight line. Find $m\angle 2$. Explain your reasoning. (See Example 5.)



- 18. DRAWING CONCLUSIONS** You are designing a box like the one shown.



- The measure of $\angle 1$ is 70° . Find $m\angle 2$ and $m\angle 3$.
- Explain why $\angle ABC$ is a straight angle.
- If $m\angle 1$ is 60° , will $\angle ABC$ still be a straight angle? Will the opening of the box be *more steep* or *less steep*? Explain.

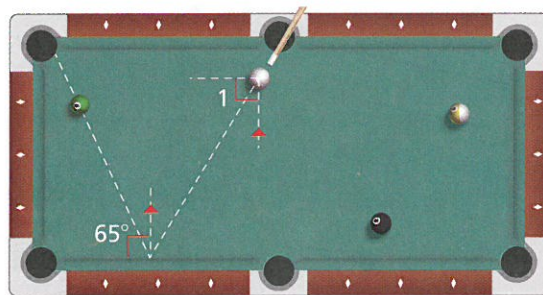
- 19. CRITICAL THINKING** Is it possible for consecutive interior angles to be congruent? Explain.

- 20. THOUGHT PROVOKING** The postulates and theorems in this book represent Euclidean geometry. In spherical geometry, all points are points on the surface of a sphere. A line is a circle on the sphere whose diameter is equal to the diameter of the sphere. In spherical geometry, is it possible that a transversal intersects two parallel lines? Explain your reasoning.

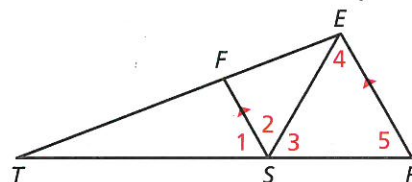
MATHEMATICAL CONNECTIONS In Exercises 21 and 22, write and solve a system of linear equations to find the values of x and y .



- 23. MAKING AN ARGUMENT** During a game of pool, your friend claims to be able to make the shot shown in the diagram by hitting the cue ball so that $m\angle 1 = 25^\circ$. Is your friend correct? Explain your reasoning.



- 24. REASONING** In the diagram, $\angle 4 \cong \angle 5$ and \overline{SE} bisects $\angle RSF$. Find $m\angle 1$. Explain your reasoning.



Maintaining Mathematical Proficiency

Reviewing what you learned in previous grades and lessons

Write the converse of the conditional statement. Decide whether it is true or false. (Section 2.1)

- If two angles are vertical angles, then they are congruent.
- If you go to the zoo, then you will see a tiger.
- If two angles form a linear pair, then they are supplementary.
- If it is warm outside, then we will go to the park.