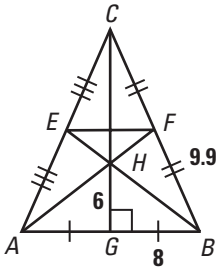
CHAPTER 5

Chapter Test

In Exercises 1–5, complete the statement with the word *always*, *sometimes*, or *never*.

1. If P is the circumcenter of $\triangle RST$, then PR, PS, and PT are __?__ equal.
2. If $\overrightarrow{BD}$ bisects $\angle ABC$, then $\overline{AD}$ and $\overline{CD}$ are __?__ congruent.
3. The incenter of a triangle __?__ lies outside the triangle.
4. The length of a median of a triangle is __?__ equal to the length of a midsegment.
5. If $\overline{AM}$ is the altitude to side $\overline{BC}$ of $\triangle ABC$, then $\overline{AM}$ is __?__ shorter than $\overline{AB}$.

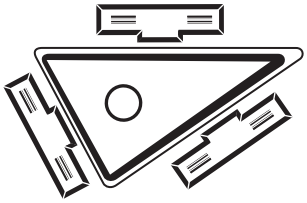
In Exercises 6–10, use the diagram.



6. Find each length.

   a. HC **b.** HB **c.** HE **d.** BC

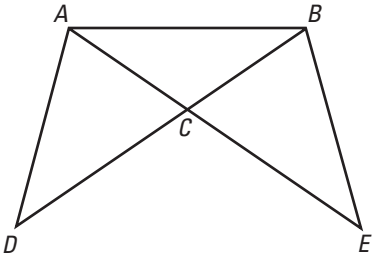
7. Point H is the __?__ of the triangle.
8. $\overline{CG}$ is a(n) __?__, __?__, __?__, and __?__ of $\triangle ABC$.
9. $EF =$ __?__ and $\overline{EF} \parallel$ __?__ by the __?__ Theorem.
10. Compare the measures of $\angle ACB$ and $\angle BAC$. Justify your answer.
11. **LANDSCAPE DESIGN** You are designing a circular swimming pool for a triangular lawn surrounded by apartment buildings. You want the center of the pool to be equidistant from the three sidewalks. Explain how you can locate the center of the pool.



In Exercises 12–14, use the photo of the three-legged tripod.

12. As the legs of a tripod are spread apart, which theorem guarantees that the angles between each pair of legs get larger?
13. Each leg of a tripod can extend to a length of 5 feet. What is the maximum possible distance between the ends of two legs?
14. Let $\overline{OA}$, $\overline{OB}$, and $\overline{OC}$ represent the legs of a tripod. Draw and label a sketch. Suppose the legs are congruent and $m\angle AOC > m\angle BOC$. Compare the lengths of $\overline{AC}$ and $\overline{BC}$.

In Exercises 15 and 16, use the diagram at the right.



15. Write a two-column proof.

   GIVEN ▶ $AC = BC$

   PROVE ▶ $BE < AE$

16. Write an indirect proof.

   GIVEN ▶ $AD \neq AB$

   PROVE ▶ $m\angle D \neq m\angle ABC$