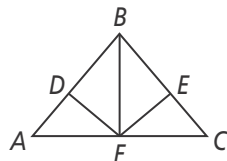


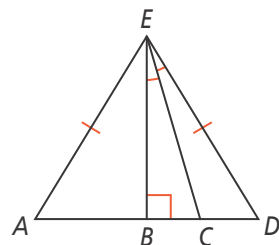


UNDERSTAND

9. **Construct Arguments** Write a two-column proof for the Angle Bisector Theorem.
10. **Construct Arguments** Write a paragraph proof for the Converse of the Angle Bisector Theorem.
11. **Reason** In the diagram below, $AB = BC$, $DF = EF$, and $m\angle BDF = m\angle BEF = 90^\circ$. Is $\triangle ADF \cong \triangle CEF$? Justify your answer.



12. **Error Analysis** A student analyzed the diagram and incorrectly concluded that $AB = 2BC$. Explain the student's error.



$\overline{EB}$ is the perpendicular bisector of $\overline{AD}$,
so $AB = BD$.
 $\angle BEC \cong \angle DEC$, so
 $BC = CD$.
 $BC + CD = BD = AB$, and
 $BC + CD = BC + BC = 2BC$,
so $AB = 2BC$.

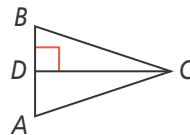


13. **Higher Order Thinking** Describe the process of constructing the bisector of an angle. Draw a diagram and explain how this construction can be related to the Angle Bisector Theorem.

PRACTICE

Use the figure shown for Exercises 14 and 15.

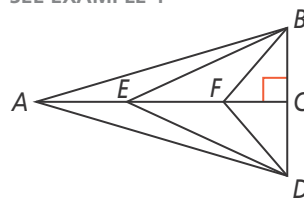
SEE EXAMPLES 1–3



14. If $AD = 3$, $AC = 8$, and $BD = 3$, what is the perimeter of $\triangle ABC$?
15. If $BC = 10$, $AB = 7$, and the perimeter of $\triangle ABC$ is 27, what is the value of BD ?

Use the figure shown for Exercises 16 and 17.

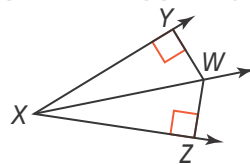
SEE EXAMPLE 4



16. If $AD = 21$, $BF = 8$, and $DF = 8$, what is the value of AB ?
17. If $EB = 6.2$, $CD = 3.3$, and $ED = 6.2$, what is the value of BD ?

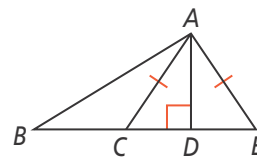
Use the figure shown for Exercises 18 and 19.

SEE EXAMPLES 5 AND 6

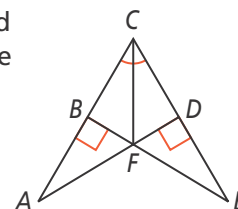


18. If $m\angle YXW = 21$, $YW = 5$, and $WZ = 5$, what is $m\angle ZXY$?
19. If $m\angle YXZ = 38$, $m\angle WXZ = 19$, and $WZ = 8.1$, what is the value of YW ?

20. If $CD = 4$ and the perimeter of $\triangle ABC$ is 23, what is the perimeter of $\triangle ABE$?

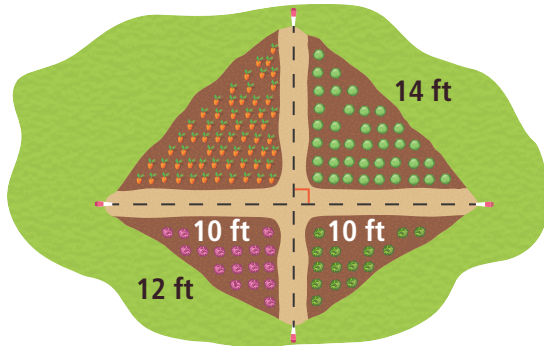


21. Given that $\angle ACF \cong \angle ECF$ and $m\angle ABF = m\angle EDF = 90$, write a two-column proof to show that $\triangle ABF \cong \triangle EDF$.

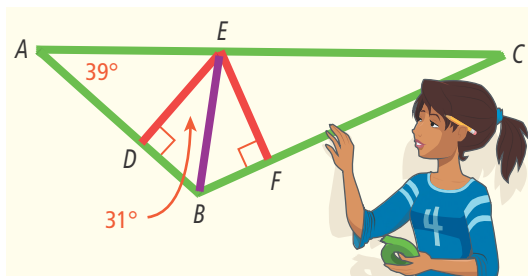


APPLY

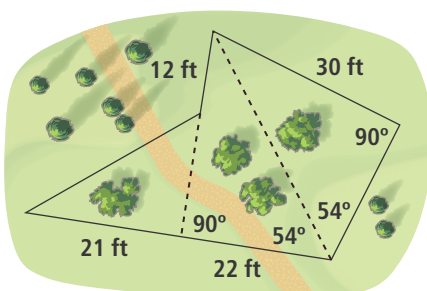
22. **Make Sense and Persevere** A gardener wants to replace the fence along the perimeter of her garden. How much new fencing will be required?



23. **Look for Relationships** An artist uses colored tape to divide sections of a mural. She needs to cut a piece of paper to cover $\triangle EFC$ while she works on other sections. What angles should she cut so she only covers the triangle?



24. **Mathematical Connections** A surveyor took some measurements of a piece of land. The owner needs to know the area of the land to determine the value. What is the area of the piece of land?



ASSESSMENT PRACTICE

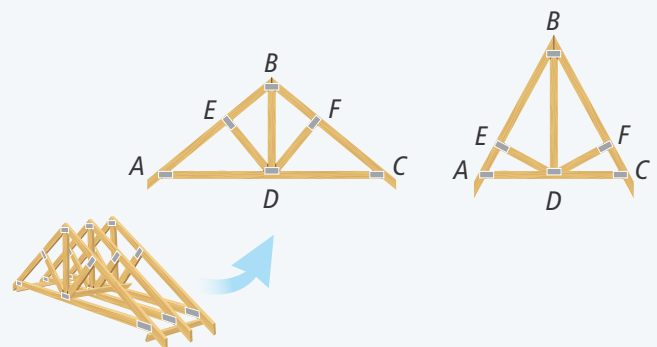
25. $\overleftrightarrow{AB}$ is the perpendicular bisector of $\overline{XY}$. Point P is the midpoint of $\overline{XY}$. Is each statement always true? Select Yes or No.

	Yes	No
$AP = XP$	☐	☐
$AB = XY$	☐	☐
$AP = BP$	☐	☐
$XB = YB$	☐	☐
$AY = XB$	☐	☐
$XP = YP$	☐	☐

26. **SAT/ACT** Points G , J , and K are not collinear, and $GJ = GK$. If P is a point on $\overline{JK}$, which of the following conditions is sufficient to prove that $\overleftrightarrow{GP}$ is the perpendicular bisector of $\overline{JK}$?

- Ⓐ $JG = PG$ Ⓒ $\angle GJK \cong \angle GKJ$
Ⓑ $m\angle GPJ = 90$ Ⓓ $PK = PG$

27. **Performance Task** A manufacturer makes roofing trusses in a variety of sizes. All of the trusses have the same shape with three supports, as shown, with $\overline{ED} \perp \overline{AB}$ and $\overline{FD} \perp \overline{BC}$.



Part A One builder needs $\angle ABD$ and $\angle CBD$ to be congruent for a project. You need to check that a truss meets the builder's requirement. The only tools you have are a measuring tape and a steel square, which is a carpentry tool for measuring right angles. How can you use these tools to verify the angles are congruent?

Part B In addition to the requirement of the first builder, another builder also needs $\overline{AB}$ and $\overline{BC}$ to be congruent as well as $\overline{AD}$ and $\overline{DC}$. Using the same tools, how can you efficiently verify that all three pairs are congruent? Explain.