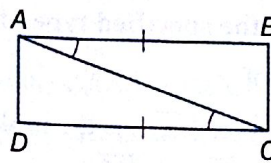**Example 4**

4. Write a two-column proof.

Given: $\overline{BA} \cong \overline{DC}$, $\angle BAC \cong \angle DCA$
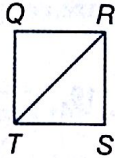Prove: $\overline{BC} \cong \overline{DA}$

Example 1

PROOF Write the specified type of proof.

5. paragraph proof

Given: $\overline{QR} \cong \overline{SR}$,
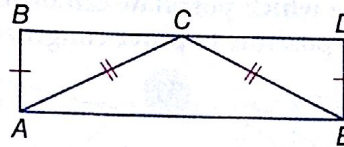$\overline{ST} \cong \overline{QT}$

Prove: $\triangle QRT \cong \triangle SRT$

6. two-column proof

Given: $\overline{AB} \cong \overline{ED}$, $\overline{CA} \cong \overline{CE}$;
$\overline{AC}$ bisects $\overline{BD}$.

Prove: $\triangle ABC \cong \triangle EDC$

7. BRIDGES The Sunshine Skyway Bridge in Florida is the world's longest cable-stayed bridge, spanning 4.1 miles of Tampa Bay. It is supported using steel cables suspended from two concrete supports. If the supports are the same height above the roadway and perpendicular to the roadway, and the topmost cables meet at a point midway between the supports, prove that the two triangles shown in the photo are congruent.
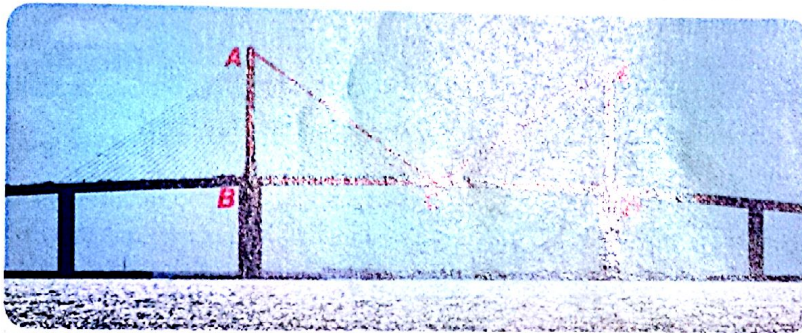
Example 2

Determine whether $\triangle MNO \cong \triangle QRS$. Explain.

8. $M(2, 5)$, $N(5, 2)$, $O(1, 1)$, $Q(-4, 4)$, $R(-7, 1)$, $S(-3, 0)$

9. $M(0, -1)$, $N(-1, -4)$, $O(-4, -3)$, $Q(3, -3)$, $R(4, -4)$, $S(3, 3)$

10. $M(0, -3)$, $N(1, 4)$, $O(3, 1)$, $Q(4, -1)$, $R(6, 1)$, $S(9, -1)$

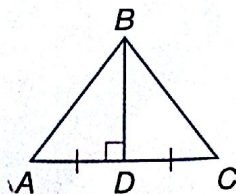**11.** $M(4, 7)$, $N(5, 4)$, $O(2, 3)$, $Q(2, 5)$, $R(3, 2)$, $S(0, 1)$

Example 3

PROOF Write the specified type of proof.

12. two-column proof

Given: $\overline{BD} \perp \overline{AC}$,
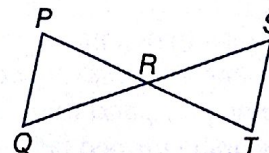$\overline{BD}$ bisects $\overline{AC}$.

Prove: $\triangle ABD \cong \triangle CBD$

13. paragraph proof

Given: R is the midpoint of
$\overline{QS}$ and $\overline{PT}$.

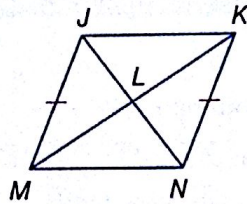Prove: $\triangle PRQ \cong \triangle TRS$

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Example 4 **PROOF** Write the specified type of proof.

14. flow proof

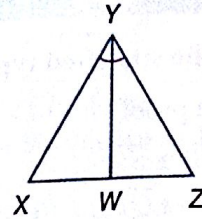Given: $\overline{JM} \cong \overline{NK}$; L is the midpoint of $\overline{JN}$ and $\overline{KM}$.
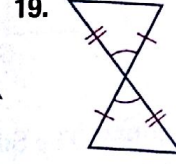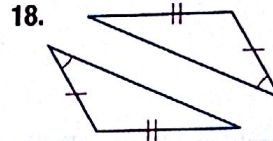
Prove: $\angle MJL \cong \angle KNL$
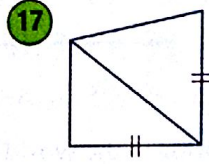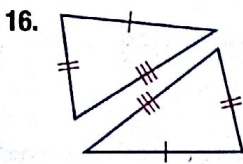

15. paragraph proof

Given: $\triangle XYZ$ is equilateral.
$\overline{WY}$ bisects $\angle XYZ$.

Prove: $\overline{XW} \cong \overline{ZW}$

Determine which postulate can be used to prove that the triangles are congruent. If it is not possible to prove congruence, write *not possible*.

16.

17

18.

19.

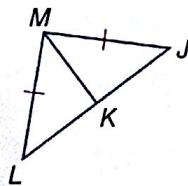

20. SIGNS Refer to the diagram at the right.

a. Identify the three-dimensional figure represented by the wet floor sign.

b. If $\overline{AB} \cong \overline{AD}$ and $\overline{CB} \cong \overline{DC}$, prove that $\triangle ACB \cong \triangle ACD$.

c. Why do the triangles not look congruent in the diagram?
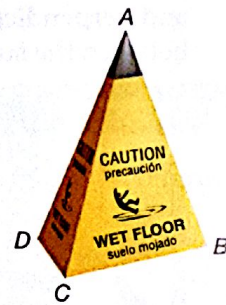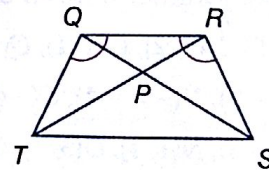

PROOF Write a flow proof.

21. Given: $\overline{MJ} \cong \overline{ML}$; K is the midpoint of $\overline{JL}$.

Prove: $\triangle MJK \cong \triangle MLK$

22. Given: $\triangle TPQ \cong \triangle SPR$
$\angle TQR \cong \angle SRQ$

Prove: $\triangle TQR \cong \triangle SRQ$

23. SOFTBALL Use the diagram of a fast-pitch softball diamond shown.

a. Write a two-column proof to prove that the distance from first base to third base is the same as the distance from home plate to second base.

b. Write a two-column proof to prove that the angle formed between second base, home plate, and third base is the same as the angle formed between second base, home plate, and first base.

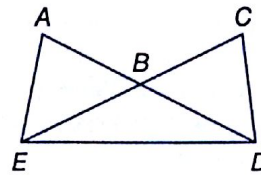Scanned by CamScanner
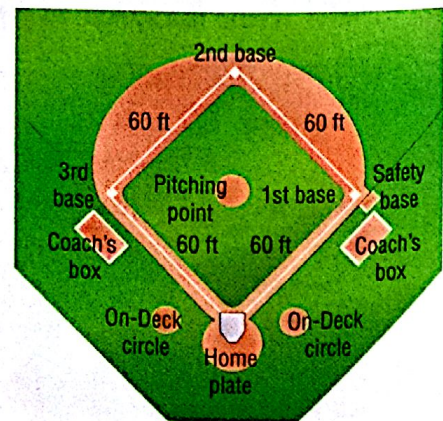
PROOF Write a two-column proof.

24. Given: $\overline{YX} \cong \overline{WZ}$, $\overline{YX} \parallel \overline{ZW}$
  Prove: $\triangle YXZ \cong \triangle WZX$
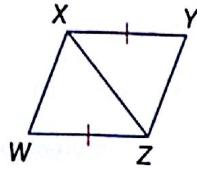
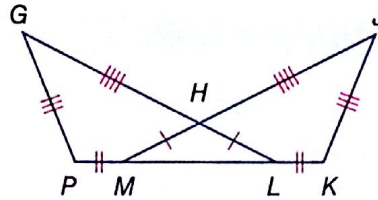**25. Given:** $\triangle EAB \cong \triangle DCB$
  Prove: $\triangle EAD \cong \triangle DCE$
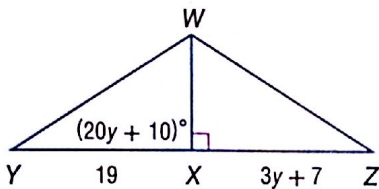
26. Write a paragraph proof.
  Given: $\overline{HL} \cong \overline{HM}$, $\overline{PM} \cong \overline{KL}$,
  $\overline{PG} \cong \overline{KJ}$, $\overline{GH} \cong \overline{JH}$
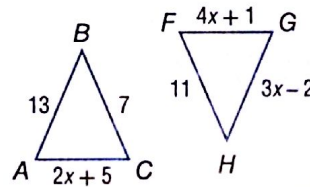 **Prove:** $\angle G \cong \angle J$

ALGEBRA Find the value of the variable that yields congruent triangles. Explain.
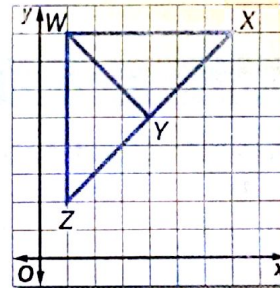
27 $\triangle WXY \cong \triangle WXZ$

28. $\triangle ABC \cong \triangle FGH$

H.O.T. Problems   Use Higher-Order Thinking Skills

29. CHALLENGE Refer to the graph shown.

  a. Describe two methods you could use to prove that $\triangle WYZ$ is congruent to $\triangle WYX$. You may not use a ruler or a protractor. Which method do you think is more efficient? Explain.

  b. Are $\triangle WYZ$ and $\triangle WYX$ congruent? Explain your reasoning.

30. REASONING Determine whether the following statement is *true* or *false*. If true, explain your reasoning. If *false*, provide a counterexample.

  If the congruent sides in one isosceles triangle have the same measure as the congruent sides in another isosceles triangle, then the triangles are congruent.

31. ERROR ANALYSIS Bonnie says that $\triangle PRQ \cong \triangle XYZ$ by SAS. Shada disagrees. She says that there is not enough information to prove that the two triangles are congruent. Is either of them correct? Explain.
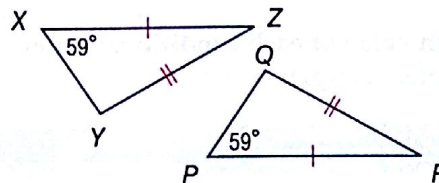
32. OPEN ENDED Use a straightedge to draw obtuse triangle ABC. Then construct $\triangle XYZ$ so that it is congruent to $\triangle ABC$ using either SSS or SAS. Justify your construction mathematically and verify it using measurement.

33. WRITING IN MATH Two pairs of corresponding sides of two right triangles are congruent. Are the triangles congruent? Explain your reasoning.