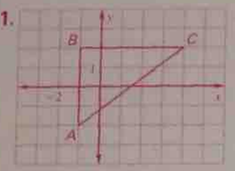
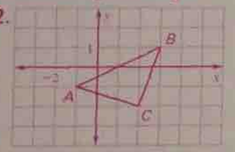
1.



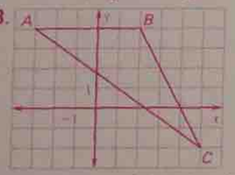
scalene; right triangle

2.



isosceles; right triangle

3.



scalene; not a right triangle

7. $\triangle DFG \cong \triangle FDE$; SAS Congruence Postulate or ASA Congruence Postulate

8. $\triangle JNM \cong \triangle KML$; since $\overline{JN} \parallel \overline{KM}$, $\angle J \cong \angle KML \cong \angle N$. Use the SAS Congruence Postulate, the SSS Congruence Postulate, or the ASA Congruence Postulate.

9. $STWX \cong UTWV$; all pairs of corresponding angles and sides are congruent.

12. No; a true congruence statement would be $\triangle PQR \cong \triangle TVU$.

13. No; a true congruence statement would be $\triangle JKM \cong \triangle LKM$.

14. Yes; use the Segment Addition Postulate to get $\overline{AC} \cong \overline{BD}$. Also, $\overline{CD} \cong \overline{CD}$, so use the SSS Congruence Postulate.

18. $\triangle NRM \cong \triangle PRQ$; $\angle NRM \cong \angle PRQ$ since they are vertical angles, and with the information given in the diagram you can use the SAS Congruence Postulate.

19. $\triangle HJL \cong \triangle KLJ$; use alternate interior angles to get $\angle HJL \cong \angle JLK$. Since $\overline{JL} \cong \overline{JL}$, with the information given in the diagram you can use the SAS Congruence Postulate.

Chapter 4

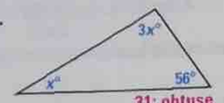
EXTRA PRACTICE

4.1 A triangle has the given vertices. Graph the triangle and classify it by its sides. Then determine if it is a right triangle. 1–3. See margin.

1. $A(-1, -2), B(-1, 2), C(4, 2)$ 2. $A(-1, -1), B(3, 1), C(2, -2)$ 3. $A(-3, 4), B(2, 4), C(5, -2)$

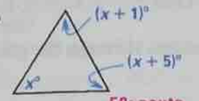
4.1 Find the value of x. Then classify the triangle by its angles.

4.



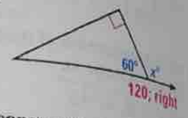
31; obtuse

5.



58; acute

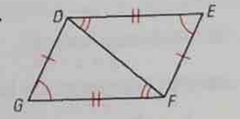
6.



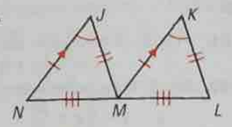
120; right

4.2 Write a congruence statement for any figures that can be proved congruent. *Explain* your reasoning. 7–9. See margin.

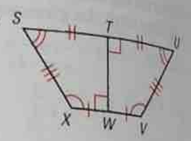
7.



8.

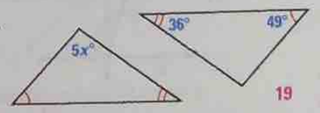


9.



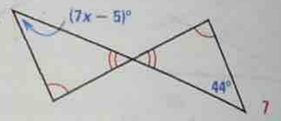
4.2 Find the value of x.

10.



19

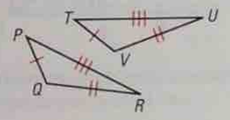
11.

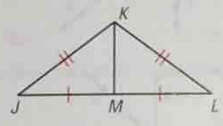


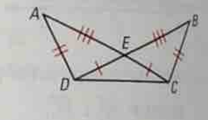
7

4.3 Decide whether the congruence statement is true. *Explain* your reasoning. 12–14. See margin.

12. $\triangle PQR \cong \triangle TUV$ 13. $\triangle JKM \cong \triangle LMK$ 14. $\triangle ACD \cong \triangle BDC$







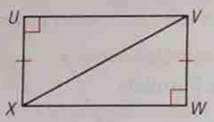
4.3 Use the given coordinates to determine if $\triangle ABC \cong \triangle PQR$.

15. $A(-2, 1), B(2, 6), C(6, 2), P(-1, -2), Q(3, 3), R(7, -1)$ congruent

16. $A(-4, 5), B(2, 6), C(-2, 3), P(2, 1), Q(8, 2), R(5, -1)$ not congruent

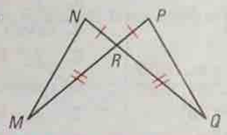
4.4 Name the congruent triangles in the diagram. *Explain*.

17.



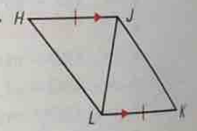
$\triangle XUV \cong \triangle VWX$; since $\overline{XV} \cong \overline{XV}$, with the givens you can use the HL Congruence Theorem.

18.



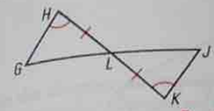
18, 19. See margin.

19.



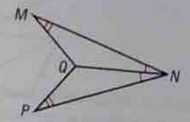
4.5 Is it possible to prove that the triangles are congruent? If so, state the postulate or theorem you would use.

20. $\triangle GHL, \triangle JKL$



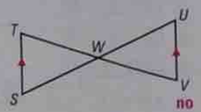
yes; ASA Congruence Postulate

21. $\triangle MNQ, \triangle PNQ$



yes; AAS Congruence Theorem

22. $\triangle STW, \triangle UVW$



no

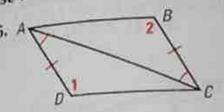
4.5 Tell whether you can use the given information to determine whether $\triangle ABC \cong \triangle DEF$. *Explain* your reasoning.

23. $\angle A \cong \angle D, \overline{AB} \cong \overline{DE}, \angle B \cong \angle E$
Yes; use the ASA Congruence Postulate.

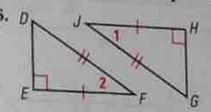
24. $\overline{AB} \cong \overline{DE}, \overline{BC} \cong \overline{EF}, \angle A \cong \angle D$
No; there is no SSA Congruence Postulate.

4.6 Use the information in the diagram to write a plan for proving that $\angle 1 \cong \angle 2$. 25–27. See margin.

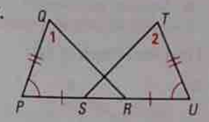
25.



26.



27.



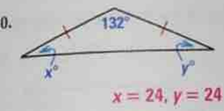
4.6 Use the vertices of $\triangle ABC$ and $\triangle DEF$ to show that $\angle A \cong \angle D$. *Explain*. 28, 29. See margin.

28. $A(0, 8), B(6, 0), C(0, 0), D(3, 10), E(9, 2), F(3, 2)$

29. $A(-3, -2), B(-2, 3), C(2, 2), D(5, 1), E(6, 6), F(10, 5)$

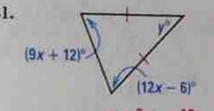
4.7 Find the value(s) of the variable(s).

30.



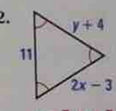
$x = 24, y = 24$

31.



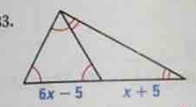
$x = 6, y = 48$

32.



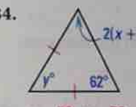
$x = 7, y = 7$

33.



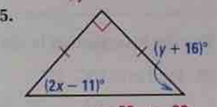
$x = 2$

34.



$x = 30, y = 56$

35.



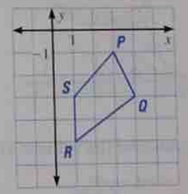
$x = 28, y = 29$

4.8 Copy the figure and draw its image after the transformation. 36–38. See margin.

36. Reflection: in the y-axis

37. Reflection: in the x-axis

38. Translation: $(x, y) \rightarrow (x - 3, y + 7)$



4.8 Use the coordinates to graph $\overline{AB}$ and $\overline{CD}$. Tell whether $\overline{CD}$ is a rotation of $\overline{AB}$ about the origin. If so, give the angle and direction of rotation. 39, 40. See margin for art.

39. $A(4, 2), B(1, 1), C(-4, -2), D(-1, -1)$
yes; 180°

40. $A(-1, 3), B(0, 2), C(-1, 2), D(-3, 1)$ no

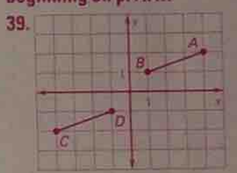
27. State the given information from the diagram, and state that $\overline{SR} \cong \overline{SR}$ by the Reflexive Property of Congruence. Then use the Segment Addition Postulate to show that $\overline{PR} \cong \overline{US}$. Use the SAS Congruence Postulate to prove $\triangle QPR \cong \triangle TUS$, and state $\angle 1 \cong \angle 2$ because corresponding parts of congruent triangles are congruent.

28. $AB = DE = 10$; $AC = DF = 8$; $BC = EF = 6$; $\triangle ABC \cong \triangle DEF$ by the SSS Congruence Postulate, and $\angle A \cong \angle D$ because corresponding parts of congruent triangles are congruent.

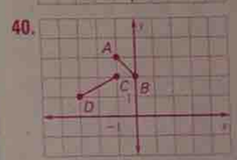
29. $AB = DE = \sqrt{26}$; $AC = DF = \sqrt{41}$; $BC = EF = \sqrt{17}$; $\triangle ABC \cong \triangle DEF$ by the SSS Congruence Postulate, and $\angle A \cong \angle D$ because corresponding parts of congruent triangles are congruent.

36–38. See Additional Answers beginning on p. AA1.

39.



40.



25. State the given information from the diagram, and state that $\overline{AC} \cong \overline{AC}$ by the Reflexive Property of Congruence. Then use the SAS Congruence Postulate to prove $\triangle ABC \cong \triangle CDA$, and state $\angle 1 \cong \angle 2$ because corresponding parts of congruent triangles are congruent.

26. State the given information from the diagram. Prove $\triangle DEF \cong \triangle GHJ$ by the HL Congruence Theorem, and state $\angle 1 \cong \angle 2$ because corresponding parts of congruent triangles are congruent.