CHAPTER 6

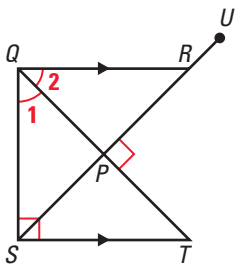
Cumulative Practice

for Chapters 1–6

1. Find the decimal forms for $\frac{4}{99}$, $\frac{18}{99}$, and $\frac{35}{99}$. Use your answers to make a conjecture about the decimal form for $\frac{89}{99}$. (1.1)

2. Draw an obtuse angle. Then bisect it. (1.4, 1.5)

In Exercises 3–8, use the figure at the right, in which $\overline{QR} \parallel \overline{ST}$, $\overline{QT} \perp \overline{SU}$, $\overline{QS} \perp \overline{ST}$, and $\angle 1 \cong \angle 2$.



3. Find the measures of $\angle URQ$ and $\angle PTS$. (3.3, 4.1)

4. Name a pair of (a) vertical angles, (b) nonadjacent complementary angles, (c) congruent supplementary angles, and (d) same-side interior angles. (1.6, 3.3, 4.1)

5. Name two pairs of congruent triangles. Write a plan for proof to show that each pair of triangles is congruent. (3.3, 4.4, 4.5)

6. Use your answer to Exercise 5 to show that $RS = 2 \cdot PS$. (2.5, 4.5)

7. P lies on the bisector of $\angle SQR$. What can you conclude about P? Explain. (5.1)

8. What kind of polygon is $PRQST$? Is it *convex* or *concave*? (6.1)

9. The measure of an exterior angle of a triangle is $(21x + 1)°$ and the measures of the two nonadjacent interior angles are $(5x + 18)°$ and $(14x - 3)°$. Find the measures of the three interior angles of the triangle. Then classify the triangle as *acute*, *obtuse*, or *right*. (4.1)

Is it possible to prove that the triangles are congruent? If so, name the postulate or theorem you would use. (4.3, 4.4, 4.6)

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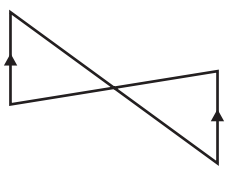

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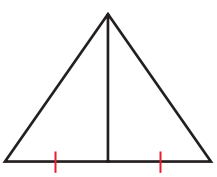

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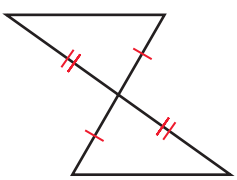

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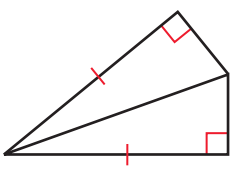


A triangle has vertices $A(11, 1)$, $B(3, 6)$, and $C(3, -4)$.

14. Find an equation of the line that is parallel to $\overleftrightarrow{AB}$ and contains point C. (3.6)

15. Show that the triangle is isosceles. (4.1, 4.7)

16. Which two angles of $\triangle ABC$ are congruent? Which theorem justifies your answer? (4.6)

17. Find an equation of the perpendicular bisector of $\overline{AC}$. (3.7, 5.1)

18. Describe the point that is equidistant from A, B, and C. (5.2)

19. Find the coordinates of the centroid of $\triangle ABC$. (5.3)

20. Find the length of the midsegment that connects sides $\overline{AB}$ and $\overline{CB}$. (5.4)

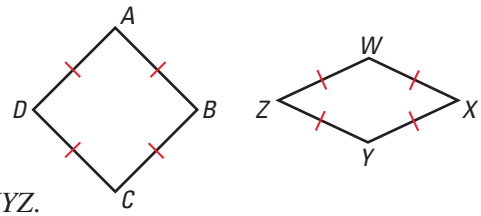
21. State the converse of the Linear Pair Postulate in if-then form. Decide whether the converse is *true* or *false*. If false, provide a counterexample. **(2.1, 2.6)**

In $\triangle XYZ$, $XY = 8$ and $YZ = 12$.

22. Describe the possible lengths for $\overline{XZ}$. **(5.5)**

23. Complete with $<$, $>$, or $=$: $m\angle X$ _?_ $m\angle Z$. Explain your answer. **(5.5)**

In Exercises 24–26, the vertices *A* and *C* of square *ABCD* are pinched together to form quadrilateral *WXYZ*.



24. Explain why $m\angle D > m\angle Z$. **(5.6)**

25. What special kind of parallelogram is quadrilateral $WXYZ$? **(6.4)**

26. If $m\angle X = 25°$, find the measures of the other three angles of $WXYZ$. **(6.1, 6.2)**

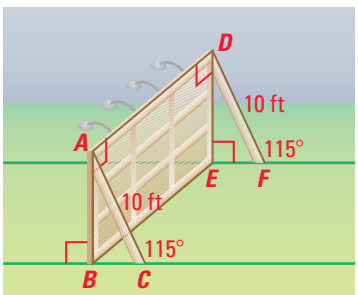
27. Determine whether $P(0, 4)$, $Q(8, 3)$, $R(9, 8)$, and $S(1, 9)$ are the vertices of a parallelogram. Explain your answer. **(6.3)**

28. In quadrilateral $EFGH$, $m\angle E = 90°$, $m\angle F = 90°$, and $m\angle G = 67°$. What special kind of quadrilateral must it be? Explain. **(6.1, 6.5)**

29. List all the types of special quadrilaterals whose diagonals are always (a) perpendicular and (b) congruent. **(6.4, 6.5, 6.6)**

30. A trapezoid has vertices $A(0, 0)$, $B(12, 0)$, $C(10, 6)$, and $D(5, 6)$. Find the length of its midsegment and its area. **(6.5, 6.7)**

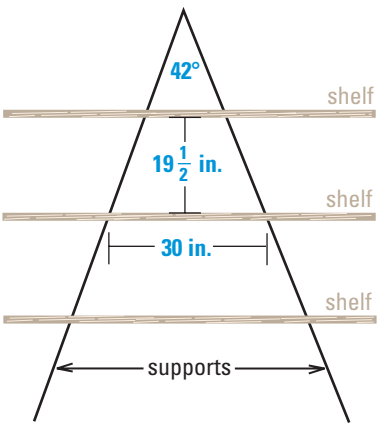
BILLBOARD SUPPORTS The two 10 ft posts that support a vertical billboard form an angle of 115° with level ground, as shown.



31. How could you show that $\triangle ABC \cong \triangle DEF$? **(4.4)**

32. What special kind of quadrilateral must $ADEB$ be? Explain. **(6.6)**

BOOKSHELF An A-frame bookshelf has two congruent supports that intersect to form an angle of 42°.



33. Find the measure of the acute angle that each shelf forms with the supports. **(4.6)**

34. The shelves divide each support into four congruent lengths. If the distance between the supports for the middle shelf is 30 inches, find the distance between the supports for the top shelf and at the floor. **(5.4, 6.5)**

35. The distance between each pair of shelves is $19\frac{1}{2}$ inches. Find the area of the region enclosed by the top shelf, the middle shelf, and the two supports. **(6.7)**