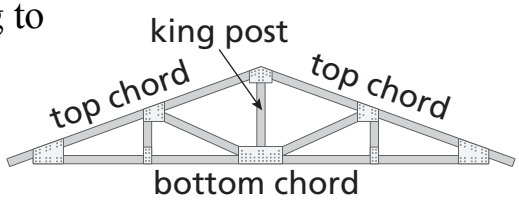
6.1 Start Thinking

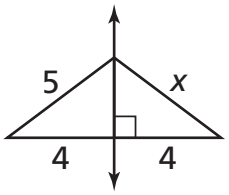
A triangular roof truss is to be created according to the diagram. The king post is constructed in the center of the bottom chord. What conclusions can you make about the roof lines as the king post gets longer? What conclusions can you make about the two top chords and the angles they form?



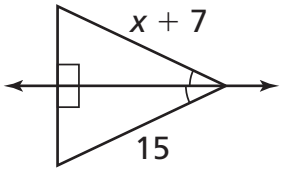
6.1 Warm Up

The diagram includes a pair of congruent triangles. Use the congruent triangles to find the value of *x* in the diagram.

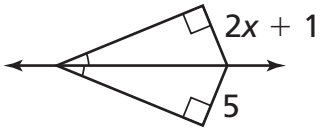
1.



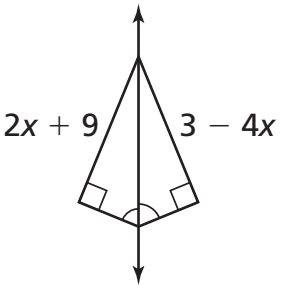
2.



3.



4.

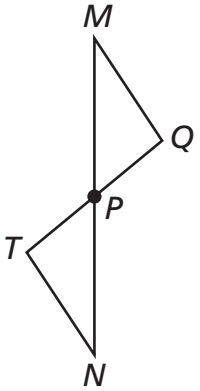


6.1 Cumulative Review Warm Up

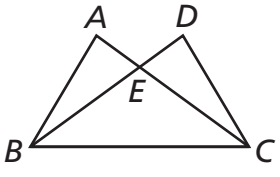
Write a proof.

1. Given:
P is the midpoint of $\overline{MN}$ and $\overline{TQ}$.

Prove:
$\triangle MQP \cong \triangle NTP$



2. Given:
$\overline{AB} \cong \overline{DC}$,
$\overline{AC} \cong \overline{DB}$



Prove:
$\triangle ABC \cong \triangle DCB$

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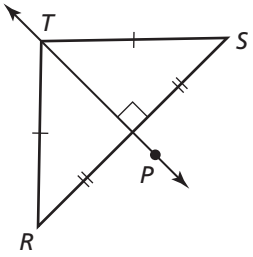
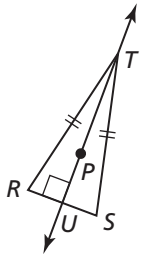
6.1 Practice A

In Exercises 1–3, tell whether the information in the diagram allows you to conclude that point *P* lies on the perpendicular bisector of $\overline{RS}$, or on the angle bisector of $\angle DEF$. Explain your reasoning.

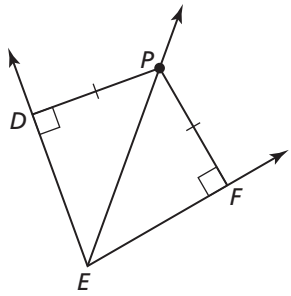
1.



2.

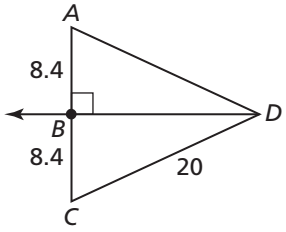


3.

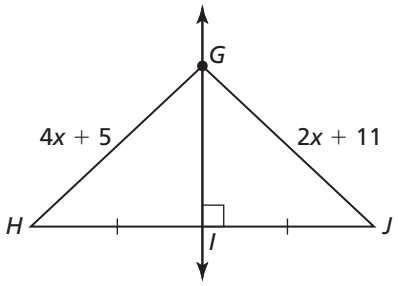


In Exercises 4–7, find the indicated measure. Explain your reasoning.

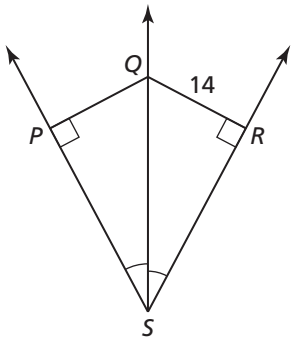
4. AD



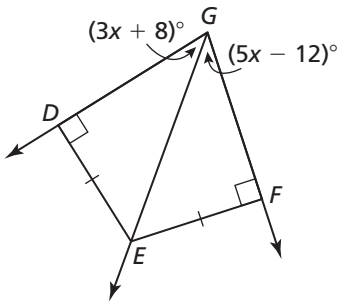
5. GJ



6. PQ



7. $m\angle DGF$



8. Write an equation of the perpendicular bisector of the segment with the endpoints $A(-2, -2)$ and $B(6, 0)$.

9. Explain how you can use the perpendicular bisector of a segment to draw an isosceles triangle.

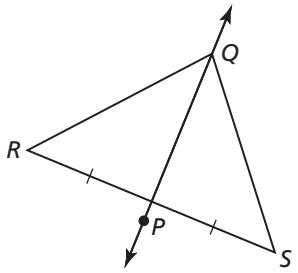
10. In a right triangle, is it possible for the bisector of the right angle to be the same line as the perpendicular bisector of the hypotenuse? Explain your reasoning. Draw a picture to support your answer.

Name _____ Date _____

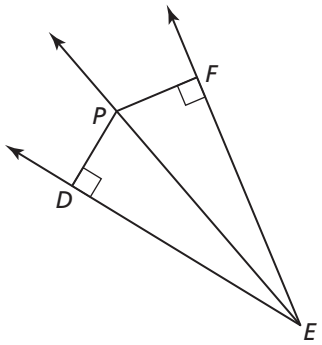
6.1 Practice B

In Exercises 1–3, tell whether the information in the diagram allows you to conclude that point *P* lies on the perpendicular bisector of $\overline{RS}$, or on the angle bisector of $\angle DEF$. Explain your reasoning.

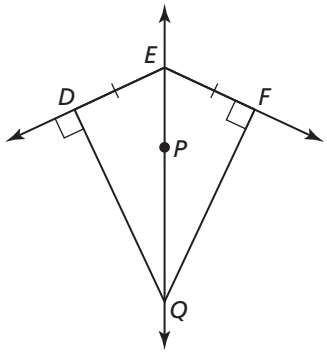
1.



2.

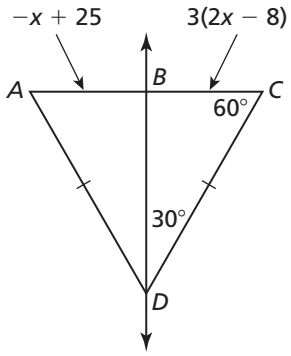


3.

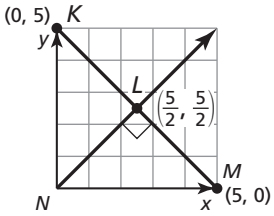


In Exercises 4–6, find the indicated measure. Explain your reasoning.

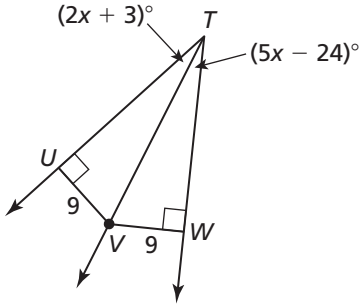
4. AC



5. $m\angle LNM$

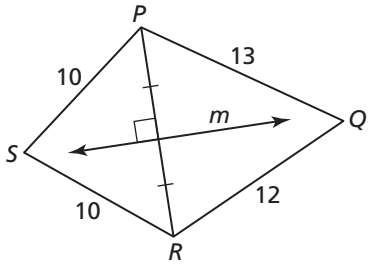


6. $m\angle UTW$

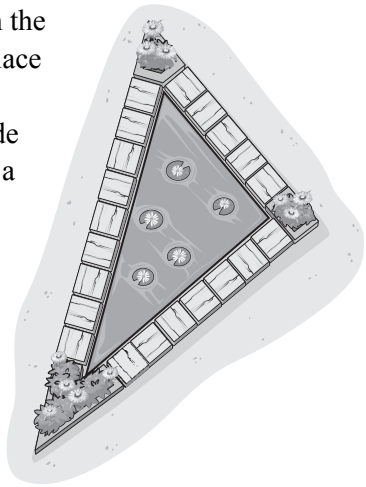


7. Write an equation of the perpendicular bisector of the segment with the endpoints $G(3, 7)$ and $H(-1, -5)$.

8. In the figure, line m is the perpendicular bisector of $\overline{PR}$. Is point Q on line m? Is point S on line m? Explain your reasoning.



9. You are installing a fountain in the triangular garden pond shown in the figure. You want to place the fountain the same distance from each side of the pond. Describe a way to determine the location of the fountain using angle bisectors.



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6.1 Enrichment and Extension

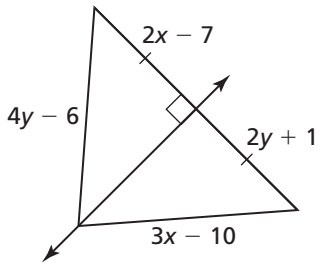
Perpendicular Bisectors

1. Given points $A(-2, 7)$ and $B(3, 3)$, find the value of x, such that $P\left(-\frac{1}{10}x + 3, -1\right)$ is on the perpendicular bisector of $\overline{AB}$.

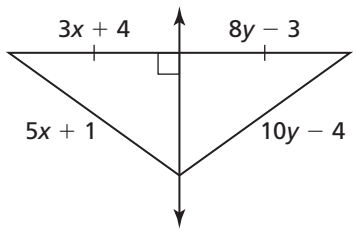
2. Use the Distance Formula to write an equation that models the points $P(x, y)$ on the perpendicular bisector of $\overline{AB}$, where $AP = PB$ and the endpoints of $\overline{AB}$ are $A(-1, 5)$ and $B(5, 2)$. Then simplify the equation to linear form.

In Exercises 3 and 4, find the values of *x* and *y*.

3.

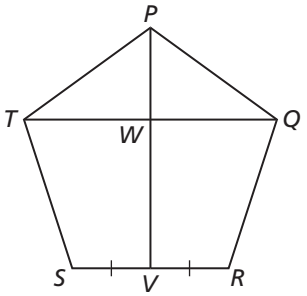


4.

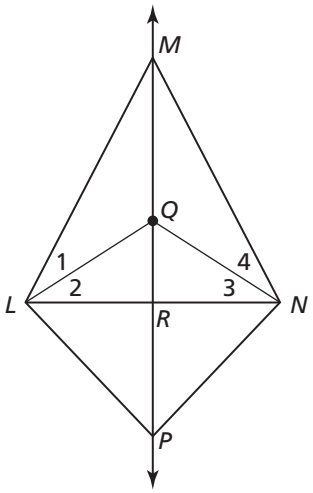


In Exercises 5 and 6, use the information in the diagram to prove the given statement.

5. $\overline{PV}$ is the perpendicular bisector of $\overline{TQ}$ for regular polygon *PQRST*.



6. $\overline{LP} \cong \overline{NP}$ if $\angle 1 \cong \angle 4$ and $\overline{LQ} \cong \overline{NQ}$.



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6.1 Puzzle Time

Why Did The Elephant Jump Up And Down? Because He . . .

A	B	C	D	E	F
G	H				

Complete each exercise. Find the answer in the answer column. Write the word under the answer in the box containing the exercise letter.

construction MOUSE	vertex THE
6 SHAKE	$(-3, 7)$ FOOT
angle MEDICINE	bisector TOOK
correct AND	-3 OF
$(6, 10)$ TO	equidistant HIS
endpoints AND	9 IT
4 RAN	line RED
$(-1, 7)$ TAIL	$(1, 1)$ FORGOT

Complete the sentence.

A. A perpendicular _____ of a line segment is the line that is perpendicular to the segment at its midpoint.

B. A point is _____ from two figures when the point is the same distance from each figure.

C. If a point is on the bisector of an angle, then it is equidistant from the two sides of the _____.

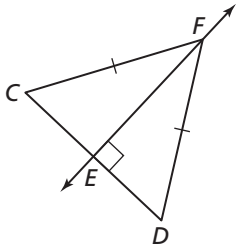
D. In a plane, if a point is on the perpendicular bisector of a segment, then it is equidistant from the _____ of the segment.

Find the midpoint of the line segment given two points.

E. $A(-2, 8), B(4, -6)$ **F.** $X(5, 17), Y(7, 3)$

Find the value of the indicated variable.

G. $CE = 3x + 5, DE = 2x + 11;$ Find x.



H. $m\angle SBK = (4y - 3)°$,
$m\angle KBW = (2y + 15)°$,
$\overline{SK} \cong \overline{WK}$. Find y.