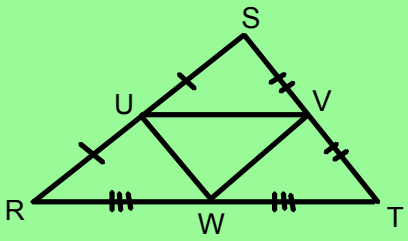
Bellwork
11/07/2011

Use the figure below the problems.



1. If UV=13, find RT.

RT=26

2. If ST=20, find UW.

UW=10

3. If the perimeter of ΔRST=68 in., find the perimeter of ΔUVW.

34 in.

4. If VW=2x-4 and RS=3x-3, what is VW?

$2(2x-4)=3x-3$

$4x-8=3x-3$

$x=5$

$2(5)-4$

$VW=6$

Geometry
5.2 Use Perpendicular Bisectors
Standard(s): 3,6

Vocabulary:

1. **Perpendicular Bisector:** A segment, ray, line, or plane that is perpendicular to a segment at its midpoint.

2. **Equidistant:** When a point, between two figures, is the same distance to each figure.

3. **Concurrent:** When three or more lines, rays, or segments intersect in the same point.

4. **Point of Concurrency:** The point of intersection of the lines, rays, or segments.

5. **Circumcenter:** The point of concurrency of the three perpendicular bisectors of a triangle.

CIRCUMCENTER The point of concurrency of the three perpendicular bisectors of a triangle is called the **circumcenter** of the triangle. The circumcenter P is equidistant from the three vertices, so P is the center of a circle that passes through all three vertices.

Acute triangle
P is inside triangle.

Right triangle
P is on triangle.

Obtuse triangle
P is outside triangle.

As shown above, the location of P depends on the type of triangle. The circle with the center P is said to be *circumscribed* about the triangle.

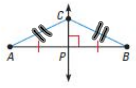
THEOREMS *For Your Notebook*

THEOREM 5.2 Perpendicular Bisector Theorem

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

If $\overleftrightarrow{CP}$ is the $\perp$ bisector of $\overline{AB}$, then $CA = CB$.

Proof: Ex. 26, p. 308

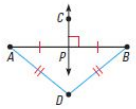


THEOREM 5.3 Converse of the Perpendicular Bisector Theorem

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

If $DA = DB$, then D lies on the $\perp$ bisector of $\overline{AB}$.

Proof: Ex. 27, p. 308



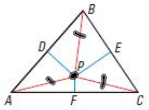
THEOREM *For Your Notebook*

THEOREM 5.4 Concurrency of Perpendicular Bisectors of a Triangle

The perpendicular bisectors of a triangle intersect at a point that is equidistant from the vertices of the triangle.

If $\overline{PD}$, $\overline{PE}$, and $\overline{PF}$ are perpendicular bisectors, then $PA = PB = PC$.

Proof: p. 933



<u>Perpendicular Bisector</u>
Has to...
1. Be $\perp$ to a segment
2. Cut the segment into 2 $\cong$ pieces

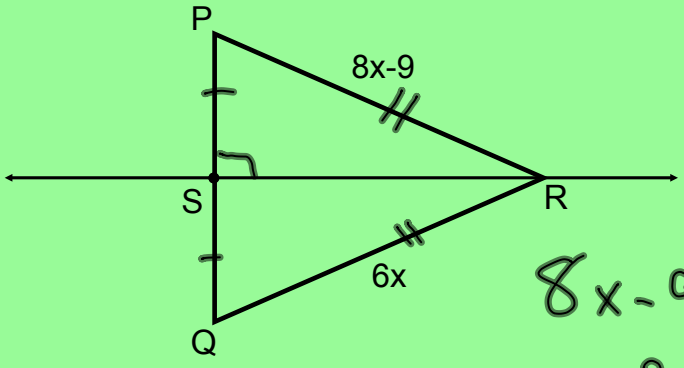
Has...
1. A point on it that is equidistant from the endpoints of the segment

<u>Circumcenter</u>
Has to...
1. Be a point of intersection of all 3 $\perp$ bisectors

Is...
1. Equidistant from the vertices of the triangle

Use the Perpendicular Bisector Theorem

In the diagram, $\overleftrightarrow{RS}$ is the perpendicular bisector of $\overline{PQ}$. Find PR.



$8x-9=6x$

$2x=9$

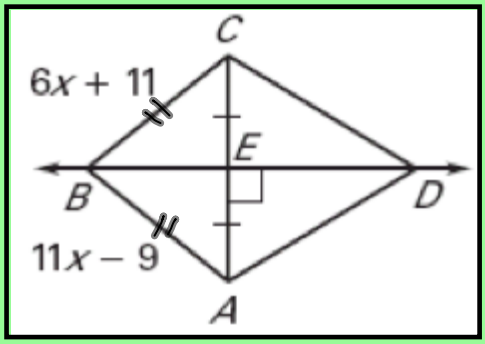
$x=\frac{9}{2}$

$48(\frac{9}{2})-9$

$36-9$

$PR=27$

Find AB.



$6x+11=11x-9$

$5x=20$

$x=4$

$11(4)-9$

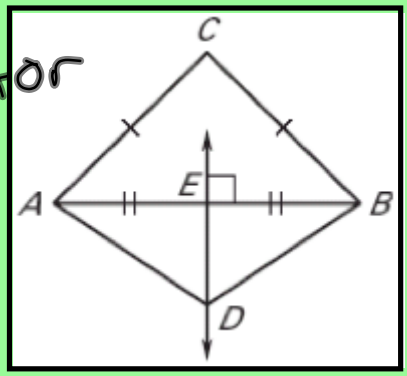
$44-9$

$AB=35$

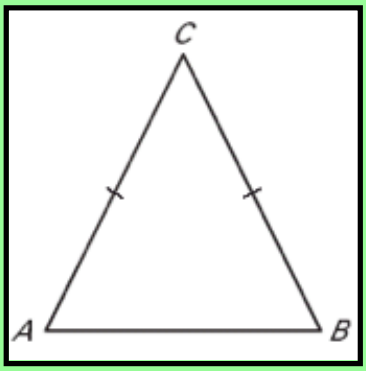
Use the Concurrency of Perpendicular Bisectors

Tell whether the information in the diagram allows you to conclude that C is on the perpendicular bisector of $\overline{AB}$. Explain.

C is on the ⊥ bisector

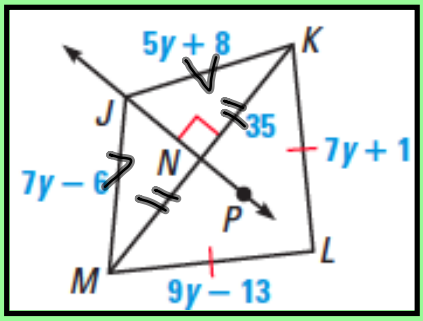


Convers of the ⊥ bisector theorem



Use Perpendicular Bisectors

In the diagram, $\overleftrightarrow{JN}$ is the perpendicular bisector of $\overline{MK}$.



Find NM. 35

Find JK. $7y-6=5y+8$

43 $2y=14$

Find KL. $y=7$

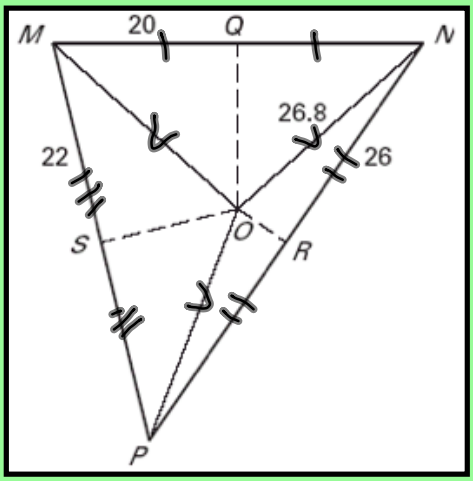
50 $7(7)+1$

Find ML. $9(7)-13$

50

Use Perpendicular Bisectors

In the diagram, the perpendicular bisectors of ΔMNP meet at point O and are shown dashed. Find the indicated measure.



Find MO. 26.8

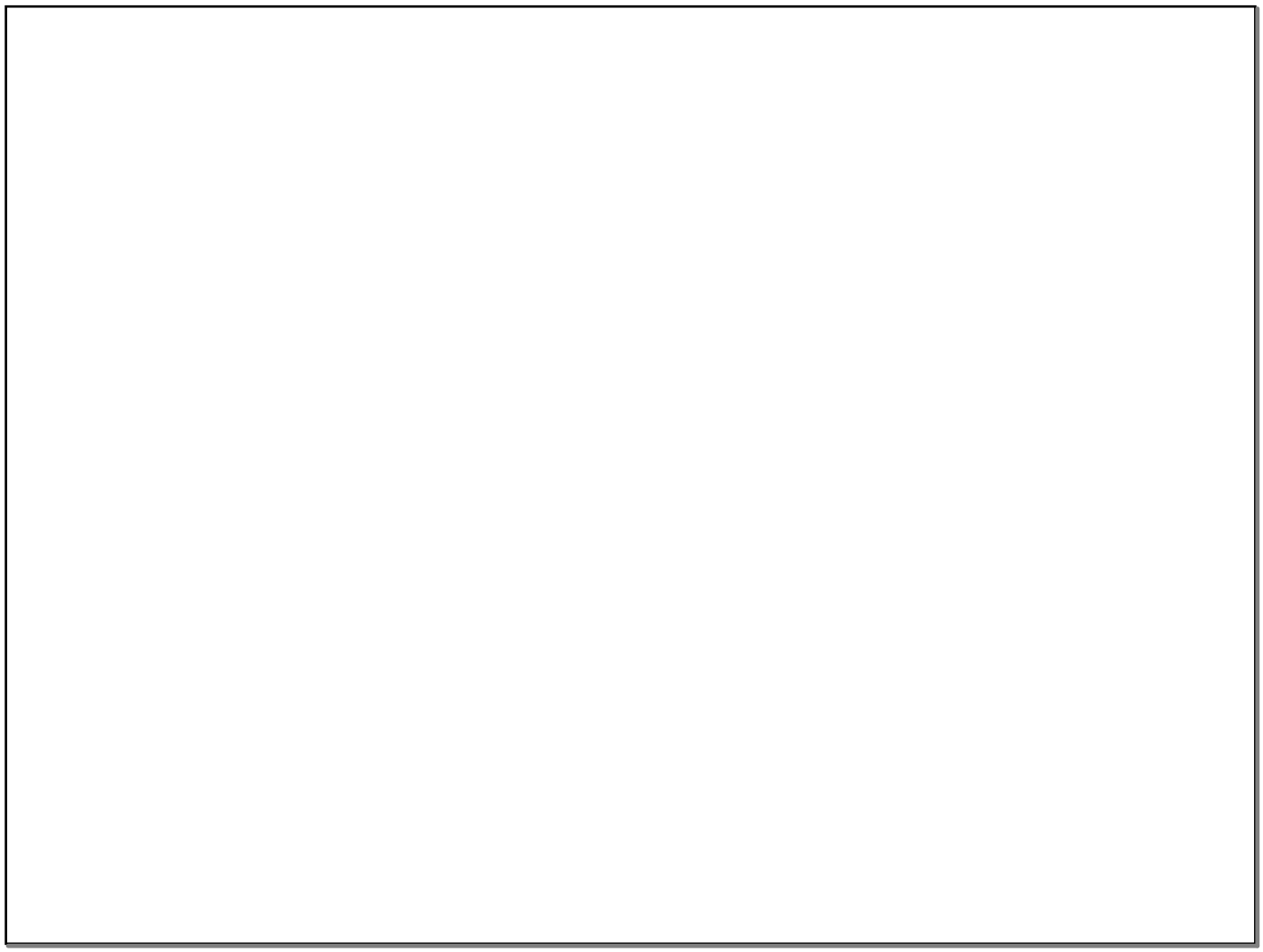
Find PR. 26

Find MN. 40

Find SP. 22

Find QN. 20

Find MP. 44

Homework Assignment

Worksheet 5.2B