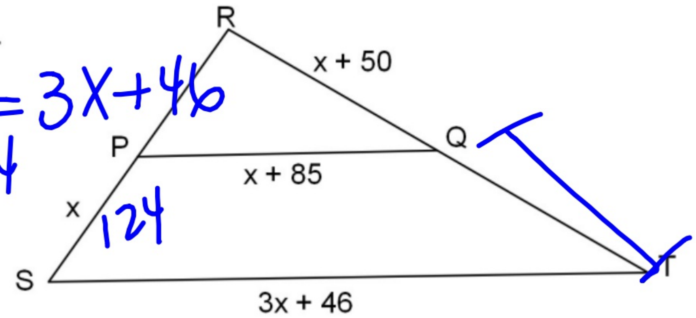
Q and P are midpoints.

$2(x+85)=3x+46$

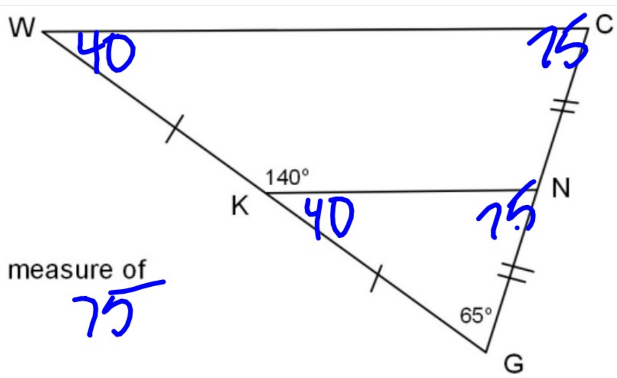
$x=124$



1. Find the length of RS. 248

2. Find the length of TQ 174

3. Find the length of TS. $3(124)+46=418$



4. Find the measure of $\angle$WCG 75

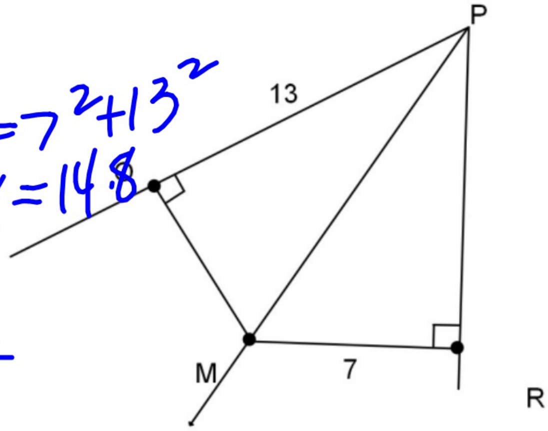
5. Find the measure of $\angle$CWG 40

$\overrightarrow{PM}$ bisects $\angle QPR$

6. Find the length of $\overline{PM}$.

$x^2 = 7^2 + 13^2$

$x = 14.8$



7. Find the length of $\overline{QM}$ 7

Geometry 5-3: Concurrent Lines, Medians and Altitudes

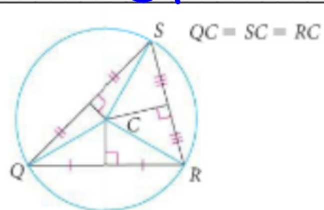
Objective 1: Properties of Bisectors

When three or more lines intersect in one point, they are called concurrent.
The point at which the lines intersect is the point of concurrency.
For any triangle, there are 4 different sets of lines that are concurrent. Theorems 5-6 and 5-7 tell you about two of them.

Theorem 5-6:
The perpendicular bisectors of the sides of a triangle are concurrent at a point equidistant from the vertices.

Theorem 5-7:
The bisectors of the angles of a triangle are concurrent at a pt equidistant from the sides.

This figure below shows ΔQRS with the perpendicular bisectors of its sides concurrent at C.
The point of concurrency of the perpendicular bisectors if a triangle is called the
circumcenter of the Δ.

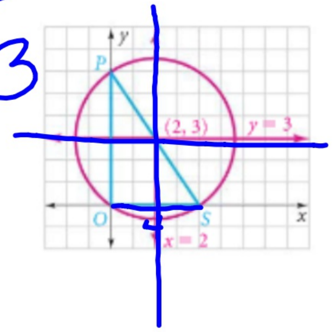


Points Q, R, and S are equdistant from C, the circumcenter. The circle is
Circumscribed about the triangle.

Example 1: Finding the center of the circle that you can circumscribe about ΔOPS.

$\perp$ bisector of sides of ΔOPS are $x=2; y=3$

$(2,3)$



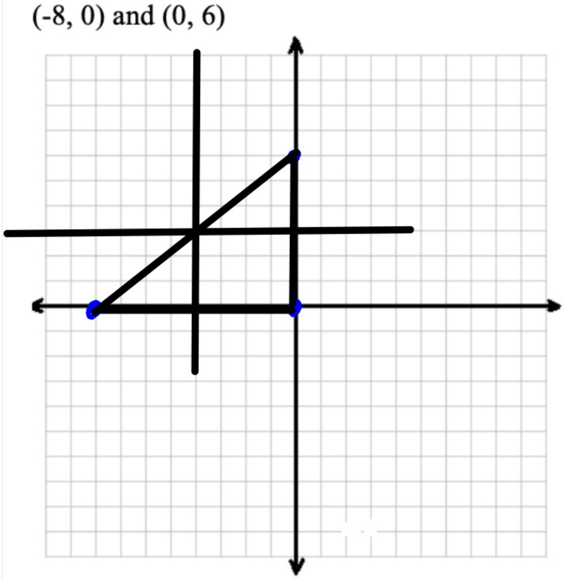
Explain why it is not necessary to find the third perpendicular bisector.

Thm 5-6

QC 1:

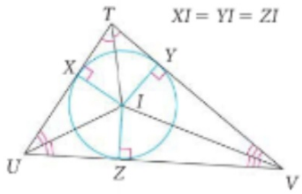
a. Find the center of the circle that you can circumscribe about the triangle with vertices at (0, 0), (-8, 0) and (0, 6)

$(-4,3)$



The figure below shows ΔUTV with the bisectors of its angles concurrent at I. The point of concurrency of the angle bisectors of a triangle is called the incenter of Δ.

Points X, Y, and Z are equid. from I, the incenter. The circle is inscribed in the triangle.



2 EXAMPLE **Real-World Connection**

Pools The Jacksons want to install the largest possible circular pool in their triangular backyard. Where would the largest possible pool be located?

QC 2:

2 **a.** The towns of Adamsville, Brooksville, and Cartersville want to build a library that is equidistant from the three towns. Trace the diagram and show where they should build the library.

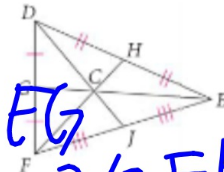
b. What theorem did you use to find the location?

Objective 2: Medians and Altitudes

A ___median___ of a triangle is a segment whose endpoints are a ___vertex___ and the midpoints of the ___opp. side___.

Theorem 5-8:
The medians of a triangle are concurrent ( ) at a point that is 2/3 of the distance from each vertex to the midpt of the opp side.

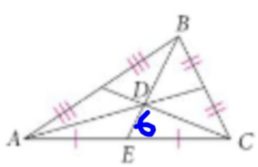
$DC = 2/3\, DJ \quad EC = 2/3\, EG$
$FC = 2/3\, FH$



*The point C is called the centroid where all the medians meet. This point can also be called the center of grav. of the △ because it is the point where a triangular shape would balance if you placed it on a point.

Example 3: Finding lengths of medians

In ΔABC, D is the centroid and DE = 6. Find BE.



$BD = 2/3\, BE$

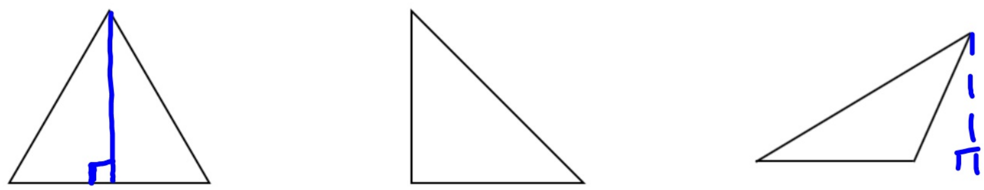
$DE = 1/3\, BE$

$1/3\, BE = 6 \Rightarrow 18$

QC 3: Find BD. Check that BD + DE = BE.

12

An alt of a triangle is the ⊥ segment from a vertex to the line cont. opp side. Unlike angle bisectors and medians, an altitude of a triangle can be a side of a triangle or it may lie inside or outside of the triangle.

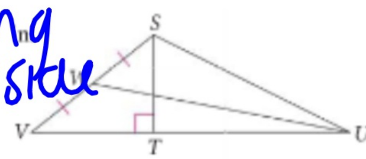


Acute Triangle	Right Triangle	Obtuse Triangle
Altitude is inside	Altitude is side	Altitude is outside

Example 4: Identifying medians and altitudes

a. Is $\overline{ST}$ a median, altitude or neither? Explain.

segment extending from vertex to the side opp. S



b. Is $\overline{UW}$ a median, altitude or neither? Explain.

median.
drawn from vertex to midpt of opp side.

Theorem 5-9:
The lines that contain the altitudes of a triangle are concurrent.

HW #27 - due tomorrow

Sec. 5-3

Pages: 275 - 276

Problems: 1, 2, 8, 9, 11-16, 19-22

IXL #16 - M.2 & M.3 due Friday at 4pm!