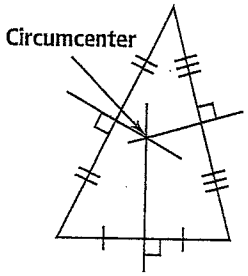
Name _____ Class _____ Date _____

Reteaching

Bisectors in Triangles

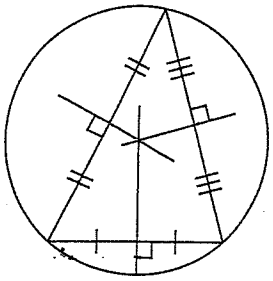
The Circumcenter of a Triangle

If you construct the perpendicular bisectors of all three sides of a triangle, the constructed segments will all intersect at one point. This point of concurrency is known as the circumcenter of the triangle.



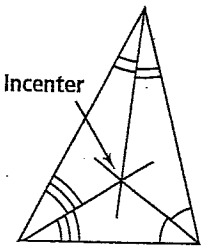
It is important to note that the circumcenter of a triangle can lie inside, on, or outside the triangle.

The circumcenter is equidistant from the three vertices. Because of this, you can construct a circle centered on the circumcenter that passes through the triangle's vertices. This is called a *circumscribed* circle.

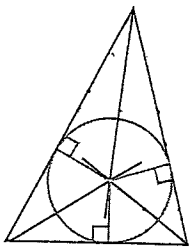


The Incenter of a Triangle

If you construct angle bisectors at the three vertices of a triangle, the segments will intersect at one point. This point of concurrency where the angle bisectors intersect is known as the *incenter of the triangle.*



It is important to note that the incenter of a triangle will always lie inside the triangle.



The incenter is equidistant from the sides of the triangle. You can draw a circle centered on the incenter that just touches the three sides of the triangle. This is called an *inscribed* circle.

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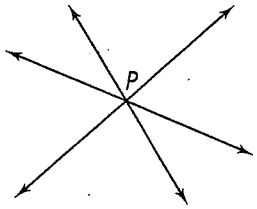
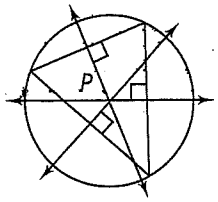
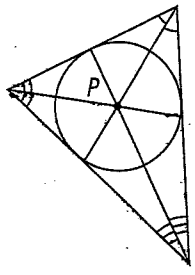
Additional Vocabulary Support

Bisectors in Triangles

For Exercises 1–5, match the term in Column A with its description in Column B. The first one is done for you.

Column A	Column B
concurrent	the point of intersection of three or more lines
1. point of concurrency	the intersection point of the three angle bisectors of a triangle
2. circumcenter of a triangle	when a circle is tangent to the three sides of a triangle
3. circumscribed about	when three or more lines intersect at a single point
4. incenter of a triangle	when a circle passes through the three vertices of a triangle
5. inscribed in	the intersection point of the three perpendicular bisectors of a triangle

For Exercises 6–8, match the phrase in Column A with the diagram in Column B that describes point *P*.

Column A	Column B
6. circumcenter of a triangle	
7. point of concurrency	
8. incenter of a triangle	

Name _____ Date _____ Block _____

Circumcenter

In the diagram, the perpendicular bisectors of $\triangle ABC$ meet at point G and are shown dashed. Find the indicated measure.

1. Find AG.

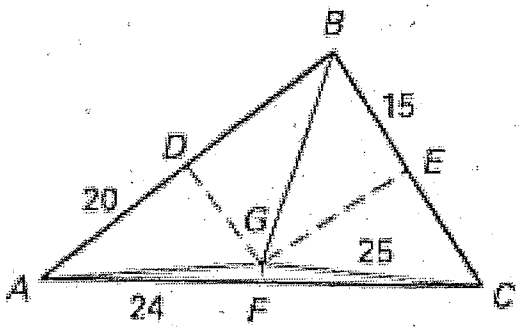
2. Find BD.

3. Find CF.

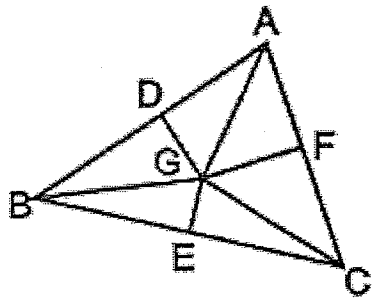
4. Find BG.

5. Find CE.

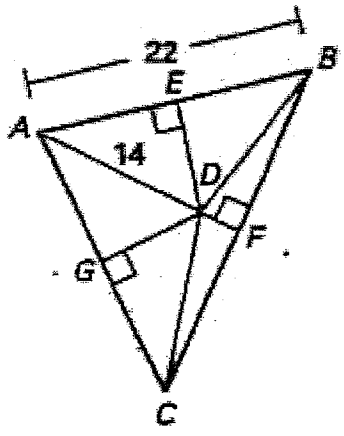
6. Find AC.



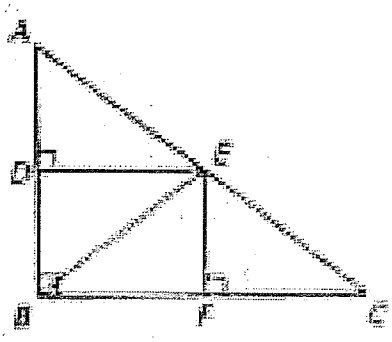
7. The perpendicular bisectors of $\triangle ABC$ meet at point G. If $\overline{BC} = 12$, $\overline{AD} = 6$, and $\overline{GE} = 3$, find GA, BE, AB, and GC.



8. The perpendicular bisectors of triangle ABC meet at point D. Find DB and AE.



Use the diagram shown. E is the circumcenter of triangle ABC.



9. $\overline{DA} \cong$ _____

10. $\overline{BF} \cong$ _____

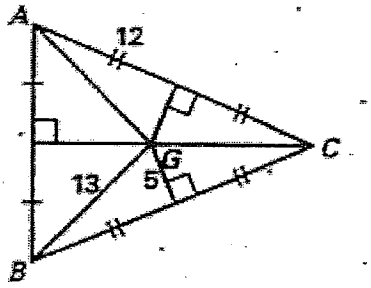
11. $\overline{DA} \cong$ _____

12. $\angle EFC \cong$ _____

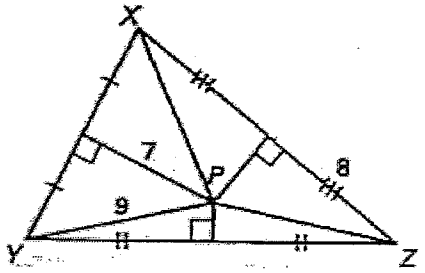
13. $\overline{BE} \cong$ _____ and _____

14. If AD=6, BF=8, and CE=10, what is the perimeter of triangle ABC?

15. a) The perpendicular bisectors of $\triangle ABC$ meet at point G. Find GA.



b) The perpendicular bisectors of $\triangle XYZ$ meet at point P. Find PX.



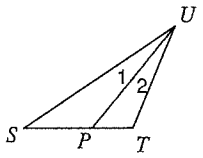
Kuta Software - Infinite Geometry Name_____

Angle Bisectors of Triangles

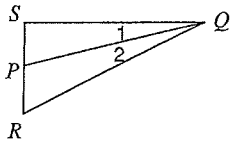
Date_____ Period____

Each figure shows a triangle with one of its angle bisectors.

1) $m\angle SUT = 34°$. Find $m\angle 1$.

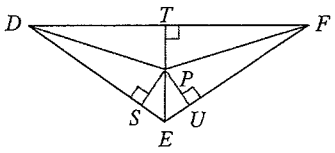


2) Find $m\angle SQR$ if $m\angle 2 = 13°$.

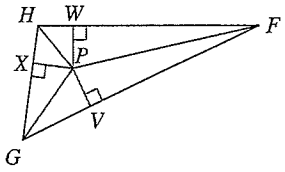


Each figure shows a triangle with its three angle bisectors intersecting at point P.

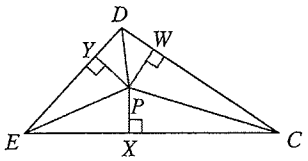
3) $PT = 3$. Find PU.



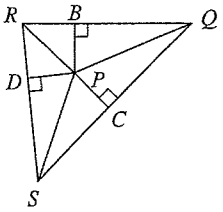
4) Find PV if $PW = 7$.



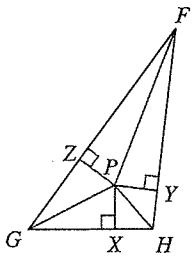
5) Find PW if $PX = 5$.



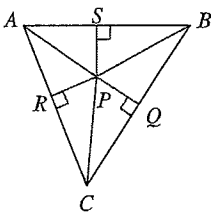
6) Find PD if $PC = 8$.



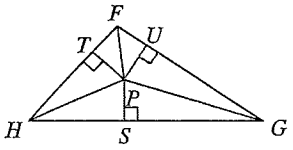
7) $PY = 2$ and $HP = 3$. Find HY.



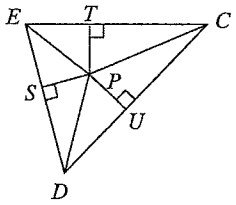
8) Find AP if $PQ = 1$ and $AR = 2$.



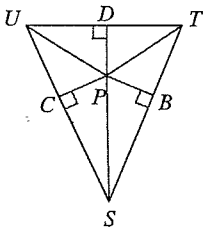
9) $PT = 5$ and $FP = 7$.
Find FT.



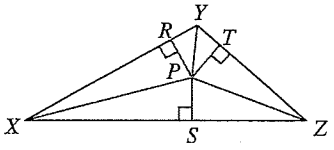
10) $PT = 3$ and $CP = 8$.
Find CT.



11) Find PB if $UC = 2$ and $UP = 3$.

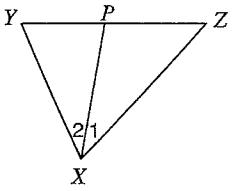


12) $PS = 3$ and $XP = 5$.
Find XS.

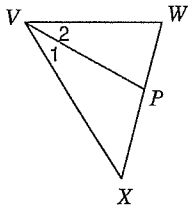


Each figure shows a triangle with one of its angle bisectors.

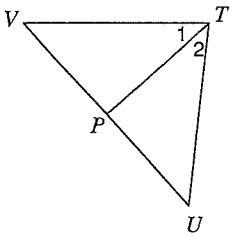
13) Find x if $m\angle 2 = 4x + 5$ and $m\angle 1 = 5x - 2$.



14) Find x if $m\angle 2 = 1 + 28x$ and $m\angle XVW = 59x - 1$.



15) $m\angle 1 = 7x + 7$ and $m\angle VTU = 16x + 4$.
Find $m\angle 1$.



16) Find $m\angle 2$ if $m\angle 2 = 7x + 5$ and $m\angle 1 = 9x - 5$.