

Reteaching

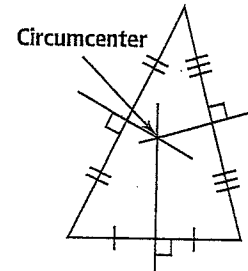
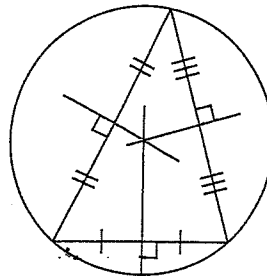
Bisectors in Triangles

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.

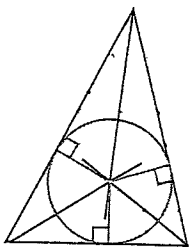
The circumcenter is equidistant from the three vertices. Because of this, you can construct a circle centered on the circumcenter that passes through the triangle's vertices. This is called a *circumscribed circle*.



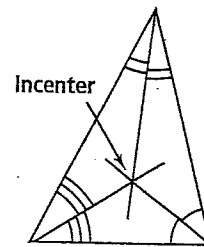
The Incenter of a Triangle

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*.



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

concurrent

1. point of concurrency

2. circumcenter of a triangle

3. circumscribed about

4. incenter of a triangle

5. inscribed in

Column B

the point of intersection of three or more lines

the intersection point of the three angle bisectors of a triangle

when a circle is tangent to the three sides of a triangle

when three or more lines intersect at a single point

when a circle passes through the three vertices of a triangle

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*.

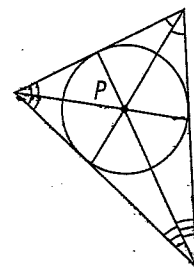
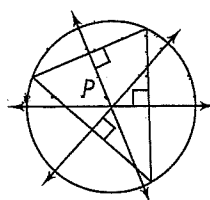
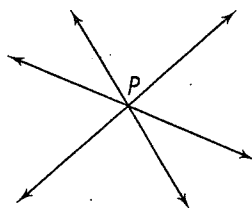
Column A

6. circumcenter of a triangle

7. point of concurrency

8. incenter of a triangle

Column B



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 .

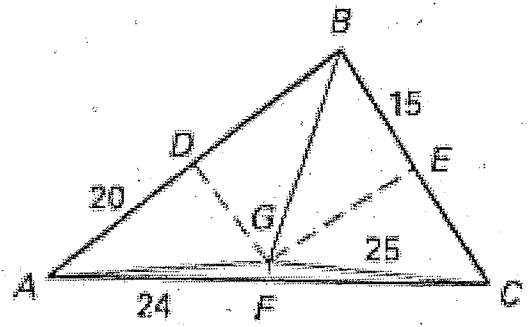
2. Find BD .

3. Find CF .

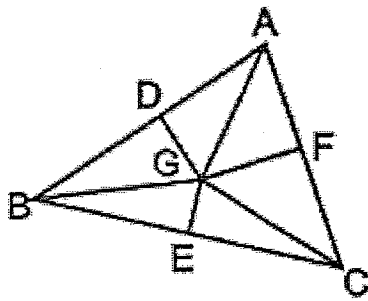
4. Find BG .

5. Find CE .

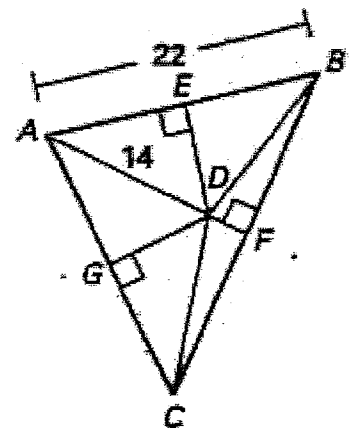
6. Find AC .



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. $\overline{DA} \cong$ _____

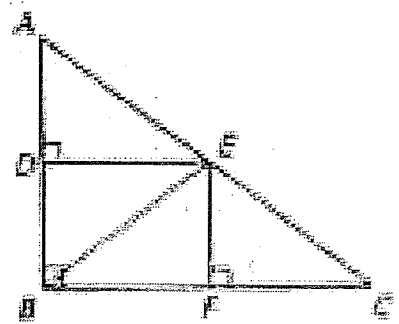
10. $\overline{BF} \cong$ _____

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

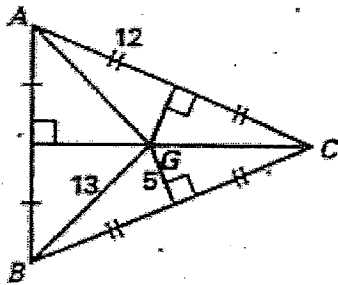
12. $\angle EFC \cong$ _____

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

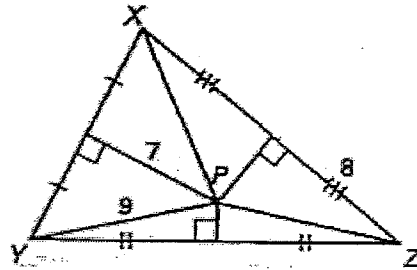
14. If $AD=6$, $BF=8$, and $CE=10$, what is the perimeter of triangle ABC?



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



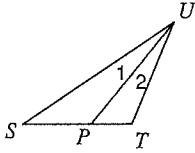
b) The perpendicular bisectors of $\triangle XYZ$ meet at point P. Find PX.



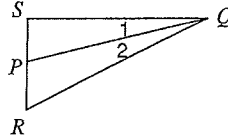
Angle Bisectors of Triangles

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

1) $m\angle SUT = 34^\circ$. Find $m\angle 1$.

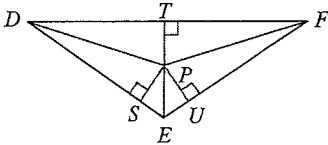


2) Find $m\angle SQR$ if $m\angle 2 = 13^\circ$.

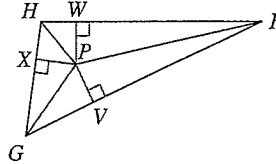


Each figure shows a triangle with its three angle bisectors intersecting at point P.

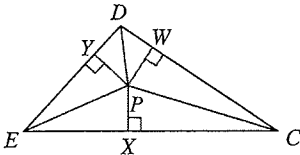
3) $PT = 3$. Find PU .



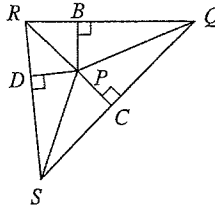
4) Find PV if $PW = 7$.



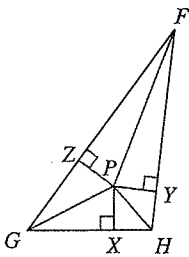
5) Find PW if $PX = 5$.



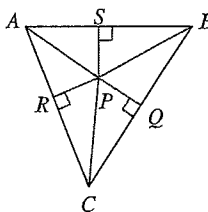
6) Find PD if $PC = 8$.



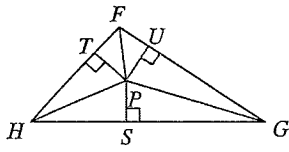
7) $PY = 2$ and $HP = 3$.
Find HY .



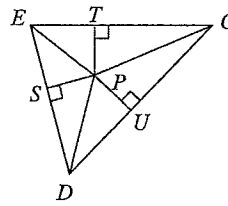
8) Find AP if $PQ = 1$
and $AR = 2$.



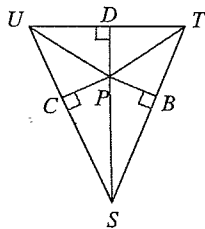
- 9) $PT = 5$ and $FP = 7$.
Find FT .



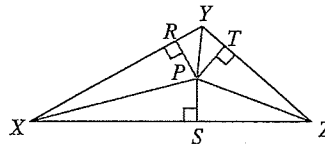
- 10) $PT = 3$ and $CP = 8$.
Find CT .



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

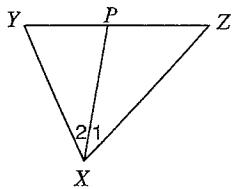


- 12) $PS = 3$ and $XP = 5$.
Find XS .

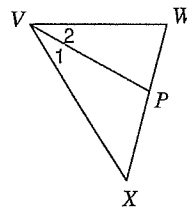


Each figure shows a triangle with one of its angle bisectors.

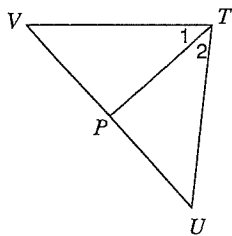
- 13) Find x if $m\angle 2 = 4x + 5$ and
 $m\angle 1 = 5x - 2$.



- 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
 $m\angle 1 = 9x - 5$.

