

Point of Concurrency Worksheet

Give the name the point of concurrency for each of the following.

1. Angle Bisectors of a Triangle incenter
2. Medians of a Triangle centroid
3. Altitudes of a Triangle orthocenter
4. Perpendicular Bisectors of a Triangle circumcenter

Complete each of the following statements.

5. The *incenter* of a triangle is equidistant from the sides of the triangle.
6. The *circumcenter* of a triangle is equidistant from the angles of the triangle.
7. The *centroid* is $\frac{2}{3}$ of the distance from each vertex to the midpoint of the opposite side.
8. To *inscribe* a circle about a triangle, you use the incenter
9. To *circumscribe* a circle about a triangle, you use the circumcenter
10. Complete the following chart. Write if the point of concurrency is inside, outside, or on the triangle.

	Acute Δ	Obtuse Δ	Right Δ
Circumcenter	inside	outside	on
Incenter	inside	inside	inside
Centroid	inside	inside	inside
Orthocenter	inside	outside	on

In the diagram, the perpendicular bisectors (shown with dashed segments) of $\triangle ABC$ meet at point G —the circumcenter. and are shown dashed. Find the indicated measure.

11. $AG = \underline{25}$ 12. $BD = \underline{20}$

13. $CF = \underline{24}$ 14. $AB = \underline{40}$

15. $CE = \underline{15}$ 16. $AC = \underline{48}$

17. $m\angle ADG = \underline{90^\circ}$

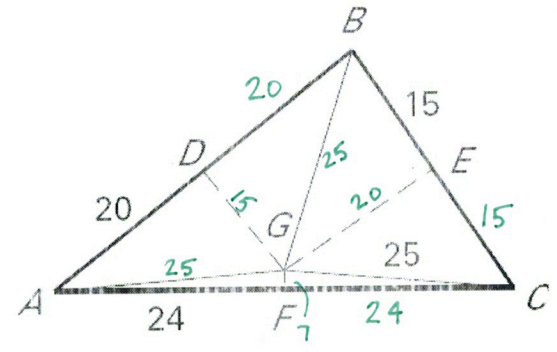
18. If $BG = (2x - 15)$, find x . $BG = 25$

$$2x - 15 = 25$$

$$2x = 40$$

$$x = 20$$

$x = \underline{20}$



In the diagram, the perpendicular bisectors (shown with dashed segments) of $\triangle MNP$ meet at point O —the circumcenter. Find the indicated measure.

19. $MO = \underline{26.8}$ 20. $PR = \underline{26}$

21. $MN = \underline{40}$ 22. $SP = \underline{22}$

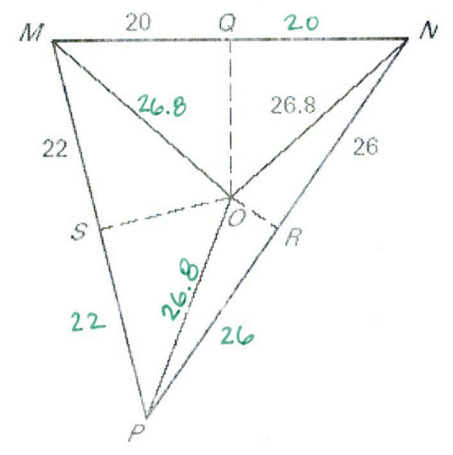
23. $m\angle MQO = \underline{90^\circ}$

24. If $OP = 2x$, find x . $OP = 26.8$

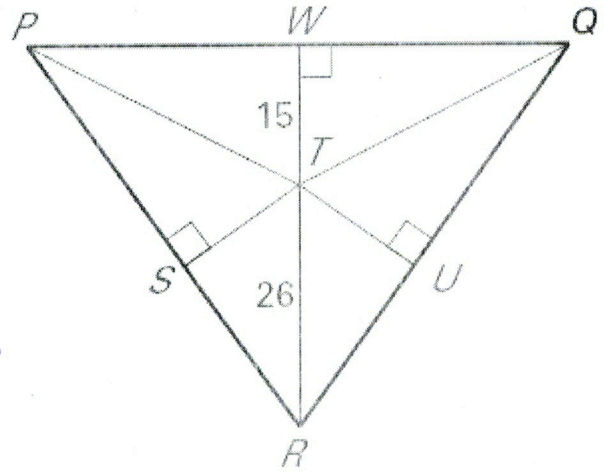
$$2x = 26.8$$

$$x = 13.4$$

$x = \underline{13.4}$



Point T is the incenter of $\triangle PQR$.



25. If Point T is the *incenter*, then Point T is the point of concurrency of

the angle bisectors.

26. $ST =$ 15

27. If $TU = (2x - 1)$, find x . $TU = 15$

$$2x - 1 = 15$$

$$2x = 16$$

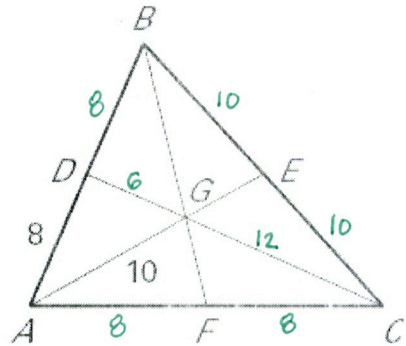
$$x = 8$$

$x =$ 8

28. If $m\angle PRT = 24^\circ$, then $m\angle QRT =$ 24°

29. If $m\angle RPQ = 62^\circ$, then $m\angle RPT =$ 31°

Point G is the centroid of $\triangle ABC$, $AD = 8$, $AG = 10$, $BE = 10$, $AC = 16$ and $CD = 18$. Find the length of each segment.



30. If Point G is the *centroid*, then Point G is the point of concurrency of

the medians.

31. $DB =$ 8

32. $EA =$ 15

33. $CG =$ 12

34. $BA =$ 16

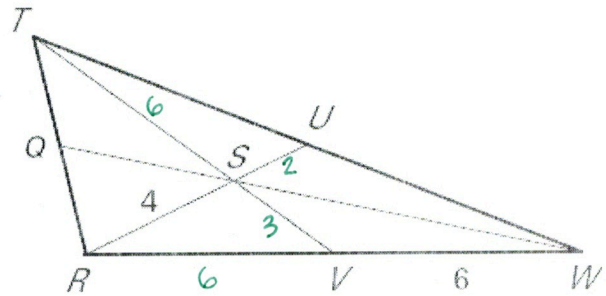
35. $GE =$ 5

36. $GD =$ 6

37. $BC =$ 20

38. $AF =$ 8

Point S is the centroid of $\triangle RTW$, $RS = 4$, $VW = 6$, and $TV = 9$. Find the length of each segment.



39. $RV = \underline{6}$

40. $SU = \underline{2}$

41. $RU = \underline{6}$

42. $RW = \underline{12}$

43. $TS = \underline{6}$

44. $SV = \underline{3}$

Point G is the centroid of $\triangle ABC$. Use the given information to find the value of the variable.

45. $FG = x + 8$ and $GA = 6x - 4$

FG is half of GA

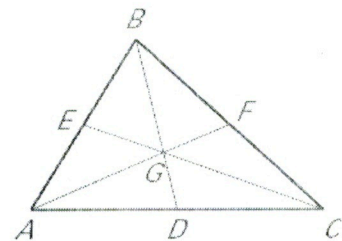
$$FG = \frac{GA}{2}$$

$$x + 8 = \frac{6x - 4}{2} \rightarrow x + 8 = 3x - 2$$

$x = \underline{5}$

$$10 = 2x$$

$$x = 5$$



46. If $CG = 3y + 7$ and $CE = 6y$

CG is two-thirds of CE

$$CG = \frac{2}{3} \cdot CE$$

$$3y + 7 = \frac{2}{3} \cdot 6y$$

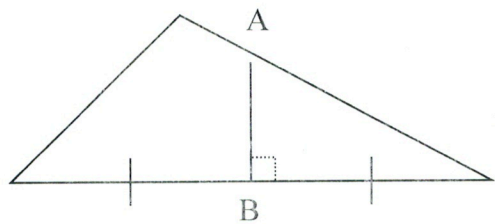
$y = \underline{7}$

$$3y + 7 = 4y$$

$$y = 7$$

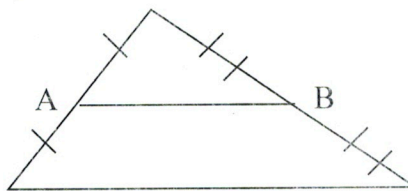
Is segment AB a midsegment, perpendicular bisector, angle bisector, median, altitude, or none of these?

47)



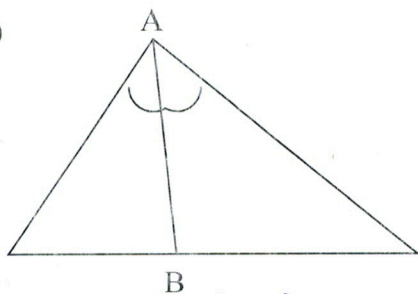
perpendicular bisector

48)



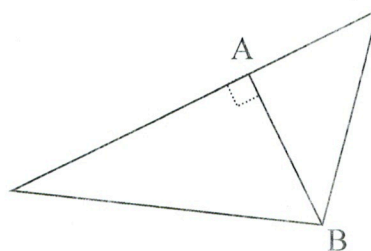
none

49)



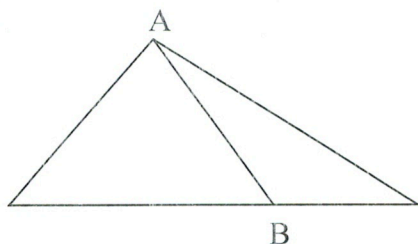
angle bisector

50)



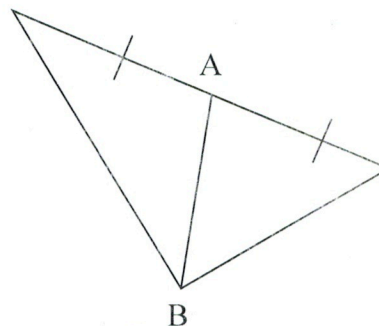
altitude

51)



none

52)



median