Name Key Date _____ Class Period _____

Point of Concurrency Worksheet

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

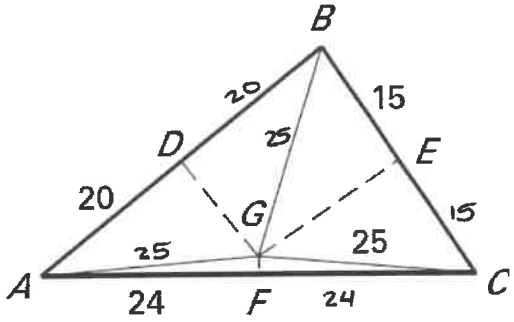
1. Angle Bisectors of a Triangle Incenter
2. Medians of a Triangle Centroid
3. Altitudes of a Triangle Orthocenter
4. Perpendicular Bisectors of a Triangle circumcenter

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 vertices of the triangle.
7. The ***centroid*** is 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 ΔABC meet at point G--the *circumcenter*. and are shown dashed. Find the indicated measure.



11. AG = 25 12. BD = 20

13. CF = 24 14. AB = 40

15. CE = 15 16. AC = 48

17. m∠ADG = 90°

18. IF BG = (2x – 15), find x.

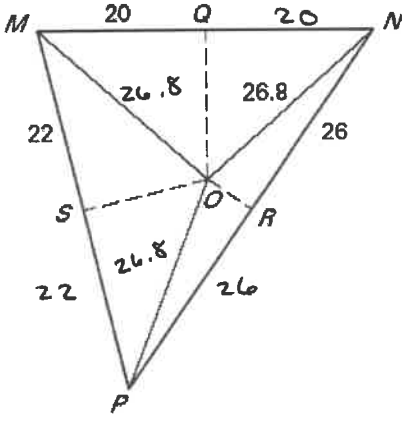
$2x - 15 = 25$

$2x = 40$

$x = 20$

x = 20

In the diagram, the perpendicular bisectors (shown with dashed segments) of ΔMNP meet at point O—the *circumcenter*. Find the indicated measure.



19. MO = 26.8 20. PR = 26

21. MN = 40 22. SP = 22

23. m∠MQO = 90°

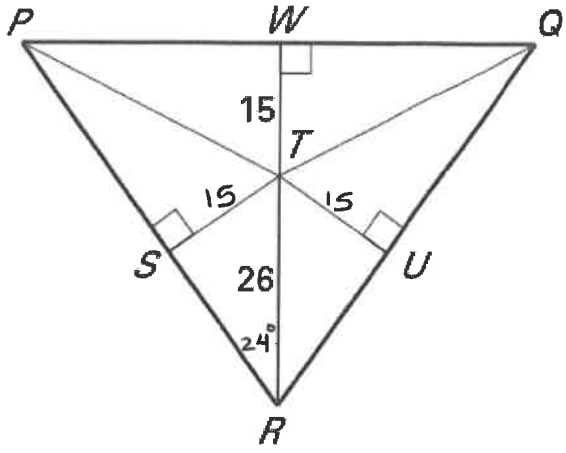
24. If OP = 2x, find x.

$26.8 = 2x$

$13.4 = x$

x = 13.4

Point *T* is the *incenter* of ΔPQR.



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.

$2x - 1 = 15$

$2x = 16$

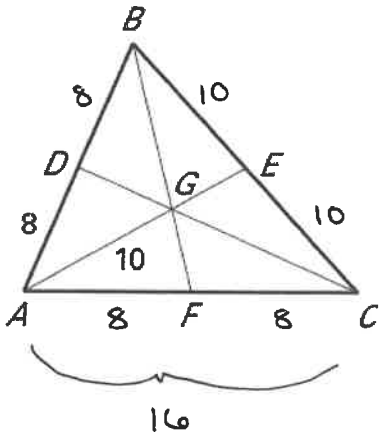
$x = 8$

x = 8

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

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

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



30. If Point G is the ***centroid***, then Point T 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

$CG = \frac{2}{3}CD$

$= \frac{2}{3}18$

$= 12$

$CG + GD = CD$

$12 + GD = 18$

$GD = 6$

$AG = \frac{2}{3}AE$

$10 = \frac{2}{3}AE$

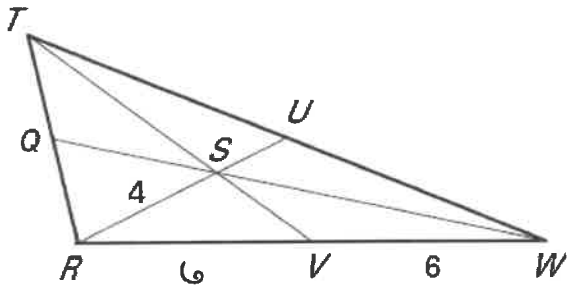
$15 = AE$

$AG + GE = AE$

$10 + GE = 15$

$GE = 5$

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



39. RV = 6

40. SU = 2

41. RU = 6

42. RW = 12

$SR = \frac{2}{3} RU$

$4 = \frac{2}{3} RU$

$6 = RU$

$RS + SU = RU$

$4 + SU = 6$

$SU = 2$

$TS = \frac{2}{3} TV$

$TS = \frac{2}{3}(9)$

$= 6$

43. TS = 6

$TS + SV = TV$

$6 + SV = 9$

$SV = 3$

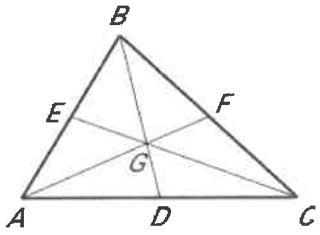
44. SV = 3

Point *G* is the centroid of ΔABC. Use the given information to find the value of the variable.

45. FG = x + 8 and GA = 6x – 4

$AG = \frac{2}{3}(FA)$

$AG = \frac{2}{3}(FG + GA)$



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

$18x - 12 = 2(7x + 4)$

$18x - 12 = 14x + 8$

$4x = 20$

$x = 5$

x = 5

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

$GG = \frac{2}{3} CE$

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

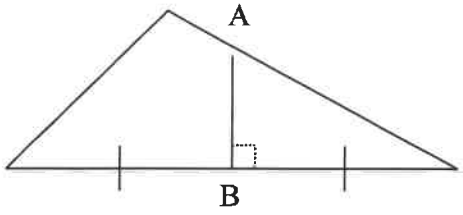
$3y + 7 = 4y$

$7 = y$

y = 7

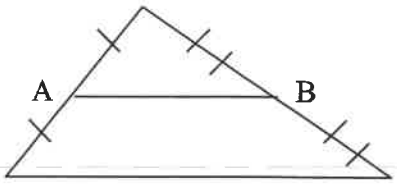
Is segment AB a *midsegment*, *perpendicular bisector*, *angle bisector*, *median*, *altitude*, or *none of these*?

47)



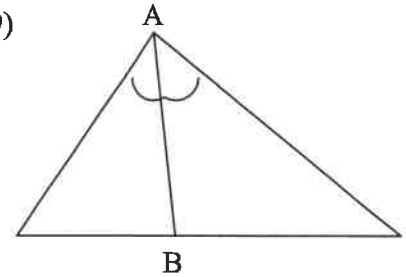
perpendicular bisector

48)



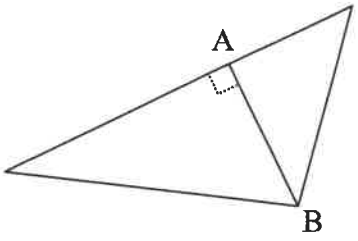
midsegment

49)



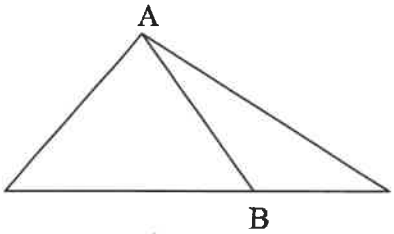
angle bisector

50)



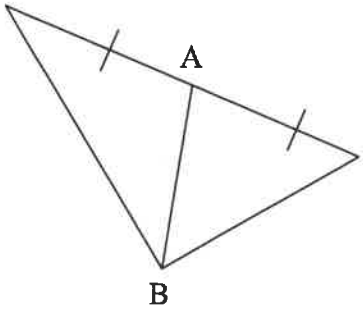
altitude

51)



none of these

52)



median