Geometry
Quiz Review
Special Segments & Points of Concurrency

Name: Key

Date: _____ Period: ____

For #1-7, fill in the correct answer.

1. The point equidistant from the vertices of a triangle is the circumcenter.

2. The distance from the vertex to the centroid is two thirds the length of the median.

3. The point of concurrency for the medians is called the centroid.

4. The point of concurrency for the perpendicular bisectors is called the circumcenter.

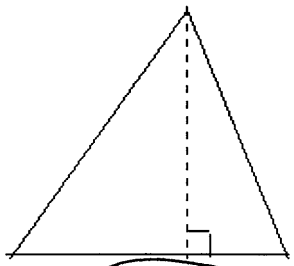
5. The point of concurrency for the lines containing the altitudes is called the orthocenter.

6. The point of concurrency for the angle bisectors is called the incenter.

7. The point equidistant from the sides of the triangle is the incenter.

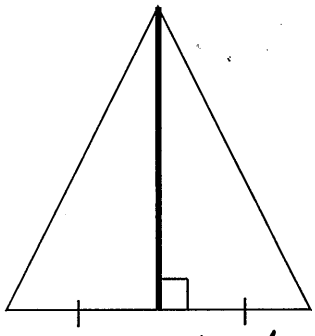
For #8-13, identify the type of segment in each triangle.

8.



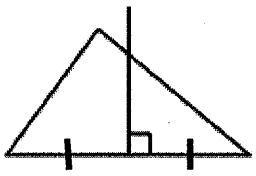
Altitude

9.



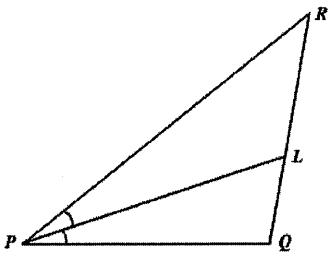
perpendicular bisector or median

10.



perpendicular bisector

11.



Angle Bisector

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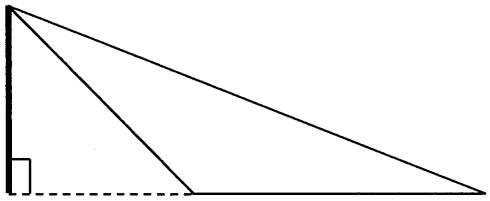
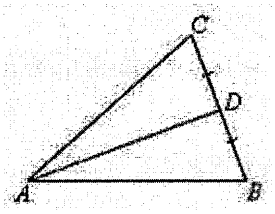
12.



Altitude

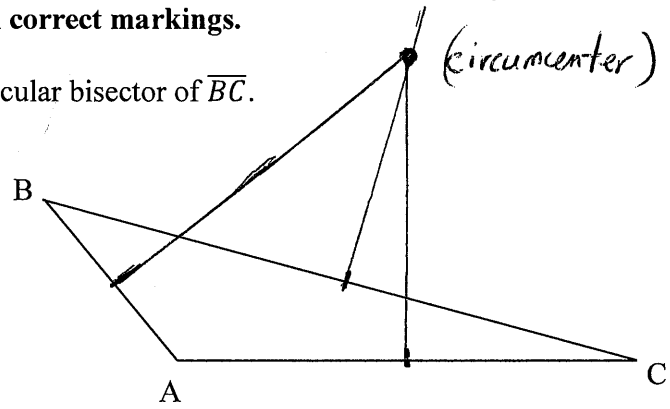
13.



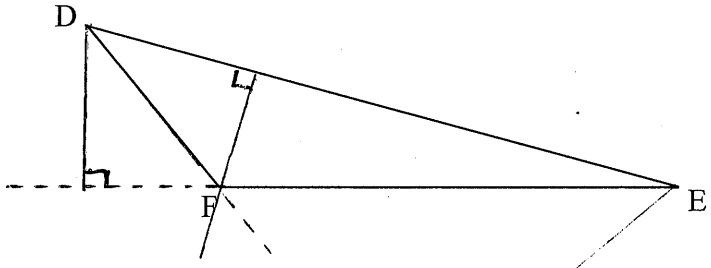
median

For #14 & 16, use a ruler to draw the indicated segments of the triangle. You must be accurate and show all correct markings.

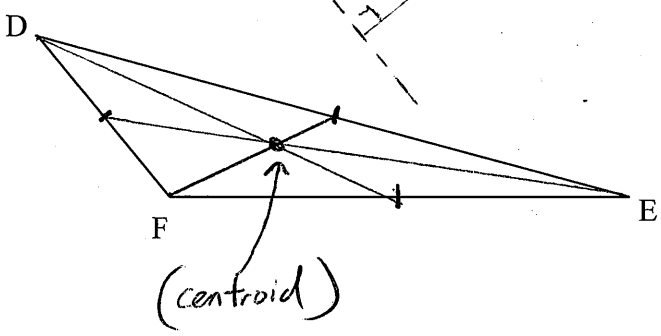
14. Perpendicular bisector of $\overline{BC}$.



15. Altitude from D to $\overline{EF}$.



16. Median from F to $\overline{DE}$.



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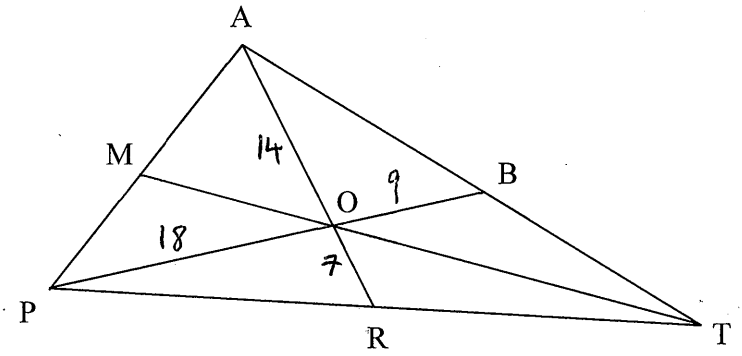
Use the following diagram for #17-21. T is the centroid of ΔPAT.



17. If PB = 27, then PO = 18.

18. If AO = 14, then OR = 7.

19. If BO = 5, then BP = 15.

20. If TO = 16, then TM = 24.

21. If RO = 3, then OA = 6.

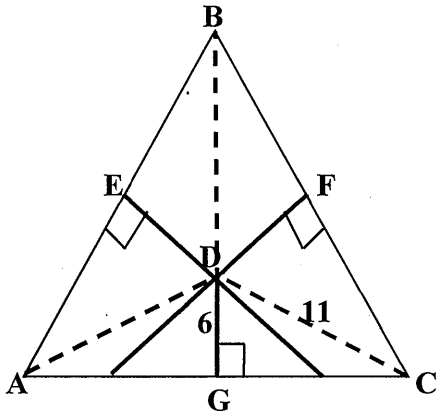
Use the following diagram for #22 - 24. Point D is the circumcenter of ΔABC. DC = 11, DG = 6

$x^2+6^2=11^2$

22. GC = $\sqrt{85}$

23. AC = $2\sqrt{85}$

24. BD = 11



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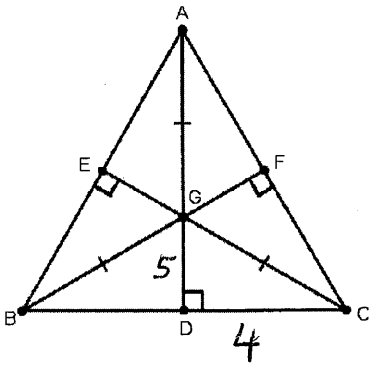
Use the following diagram for #25 - 27. Point G is the incenter of $\triangle ABC$.
$\overline{DC} = 4$, $\overline{GF} = 5$, $m\angle ABC = 50°$

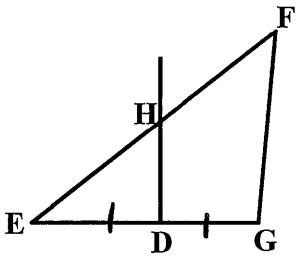


25. BC = 8

26. $m\angle ABF$ = 25°

27. GE = 5

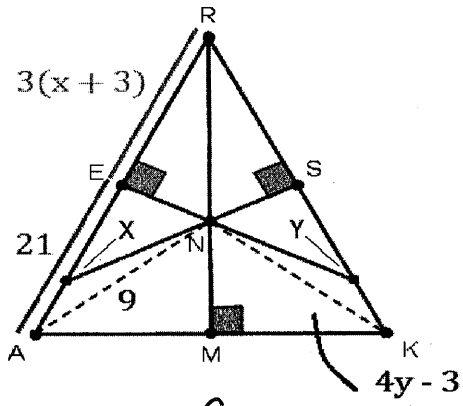
28. **In $\triangle EFG$, $\overline{DH}$ is a perpendicular bisector of $\overline{EG}$ with D on $\overline{EG}$. If ED = 7x + 10, GD = 9x - 2, and $m\measuredangle HDG = (4y + 2)^0$. Find the value of x and y. Show work.**



$7x + 10 = 9x - 2$
$12 = 2x$
$\boxed{6 = x}$

$4y + 2 = 90$
$4y = 88$
$\boxed{y = 22}$

29. **N is the circumcenter of $\triangle ARK$.**



$3(x+3) = 21$
$3x + 9 = 21$
$3x = 12$
$\boxed{x = 4}$

$4y - 3 = 9$
$4y = 12$
$y = 3$

ER = 21

KN = 9

RN = 9

x = 4

y = 3

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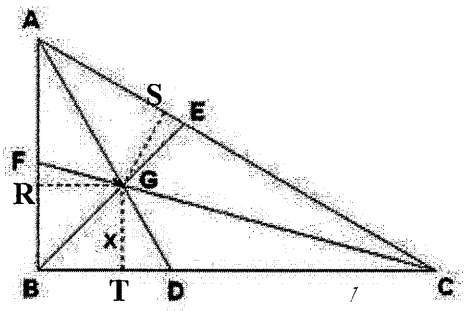
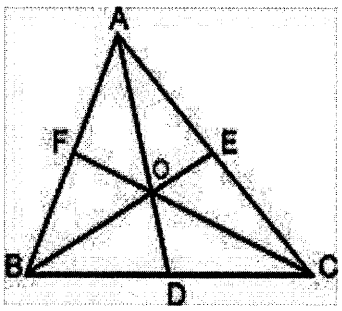
30. **G is the incenter of ΔABC. $\overline{GR} \perp \overline{AB}$, $\overline{GT} \perp \overline{BC}$, $\overline{GS} \perp \overline{AC}$; GR = 7, and m∡BAC = 60^0.**



GT = 7 **m∡BAG =** 30^0

31. **O is the centroid of ΔABC. Each question is unrelated to the previous question.**



a. **If CO = 6, then OF =** 3.
b. **If AD = 12, then AO =** 8 **and OD =** 4.
c. **If BF = 4, then AF =** 4.
d. **If OE = 5, then BO =** 10.

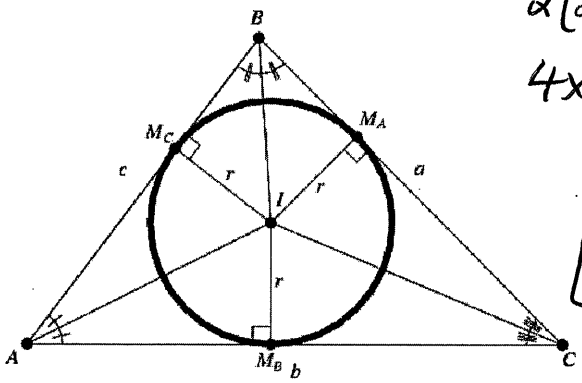
32. **I is the incenter of ΔABC. Let m∡ABC = $(6x - 4)^0$ and m∡ABI = $(2x + 10)^0$. Find x and the m∡CBI.**

$2(2x+10) = 6x - 4$

$4x + 20 = 6x - 4$

$24 = 2x$

$\boxed{12 = x}$



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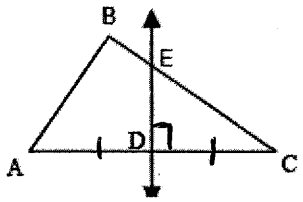


In ΔABC, $\overline{DE}$ is a perpendicular bisector of $\overline{AC}$ with D on $\overline{AC}$.

33. If **m∡EDC = (2y + 12)^0.** Find the value of **y.**

$2y+12=90$

$2y=78$

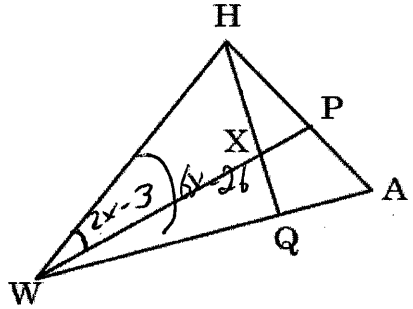
$y=39$

34. If **AD = 2x + 6** and **DC = 4x – 42.** Find the value of **x.**

$4x-42=2x+6$

$2x=48$

$x=24$



35. **$\overline{WP}$ is a median and an angle bisector of ΔHWA.**

m∡HWP = (2x – 3)^0 and m∡HWA = (6x – 26)^0. Find x.

$2(2x-3)=6x-26$

$4x-6=6x-26$

$20=2x$

$10=x$

6

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.

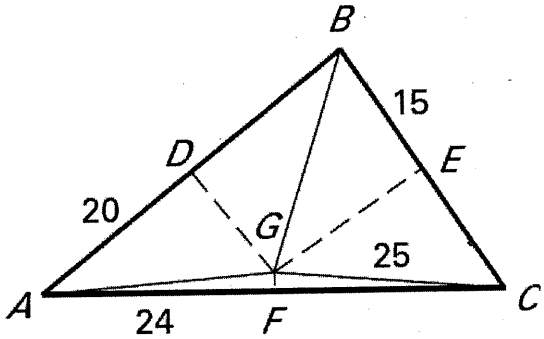
5. The ***incenter*** of a triangle is equidistant from the sides of the triangle.
6. The ***circumcenter*** of a triangle is equidistant from the vertices (corners) of the triangle.
7. The ***centroid*** is two-thirds of the distance from each vertex to the midpoint of the opposite side.
8. To ***inscribe*** a circle about a triangle, you use the incenter (Angle Bisector)
9. To ***circumscribe*** a circle about a triangle, you use the circumcenter (perpendicular bisector)
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 triangle
Incenter	inside	inside	inside
Centroid	inside	inside	inside
Orthocenter	inside	outside	on triangle

I
AB
C
M
inside

O
A
CC
PP
sometimes inside

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.

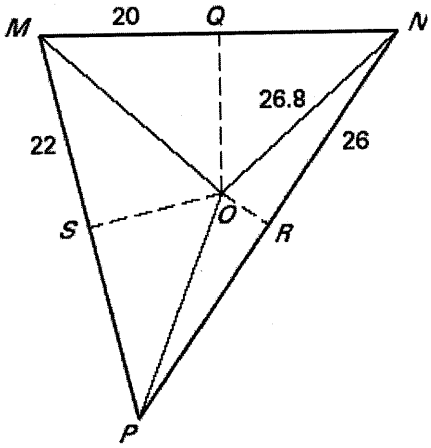
$2x - 15 = 25$

$2x = 40$

$x = 20$

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°

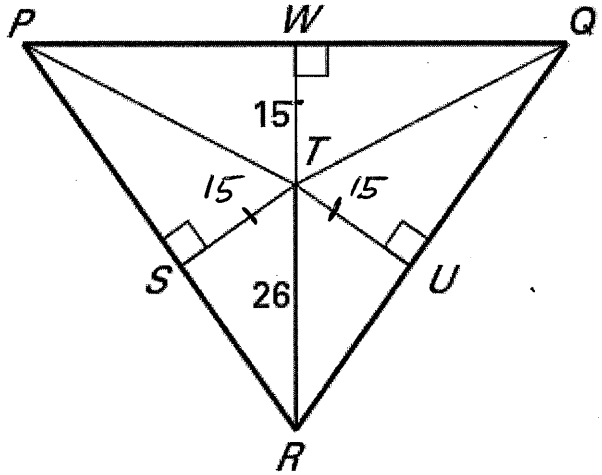
24. If OP = 2x, find x.

$2x = 26.8$

$x = 13.4$

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 Bisector.

26. ST = 15

27. If TU = (2x – 1), find x.

$2x - 1 = 15$

$2x = 16$

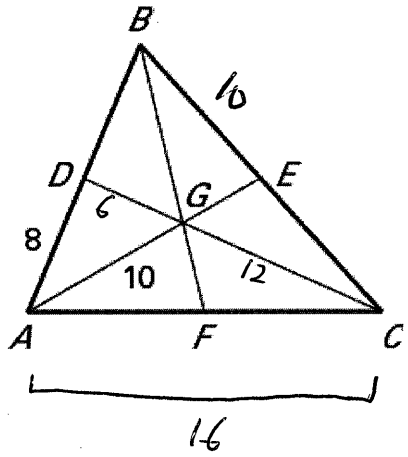
$x = 8$

x = 8

28. If m∠PRT = 24°, then m∠QRT = 24°

29. If m∠RPQ = 62°, then m∠RPT = 31°

***Point G is* the *centroid* of Δ *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 T is the point of concurrency of

the median.

31. DB = 8

32. EA = 15

33. CG = 12

34. BA = 16

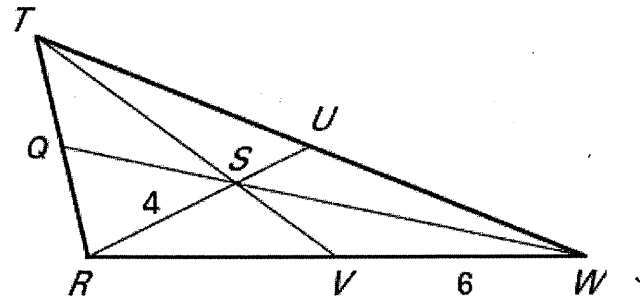
35. GE = 5

36. GD = 6

37. BC = 20

38. AF = 8

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



39. RV = 6

40. SU = 2

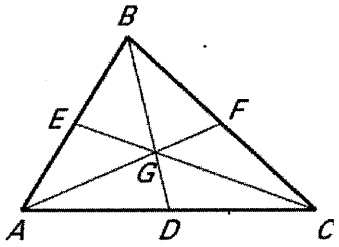
41. RU = 6

42. RW = 12

43. TS = 6

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

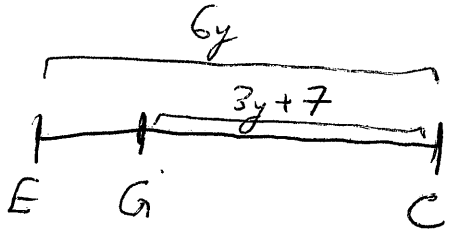
$2(x+8) = 6x - 4$

$2x + 16 = 6x - 4$

$20 = 4x$

$5 = x$

x = 5



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

$CG = \frac{2}{3}(EC)$

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

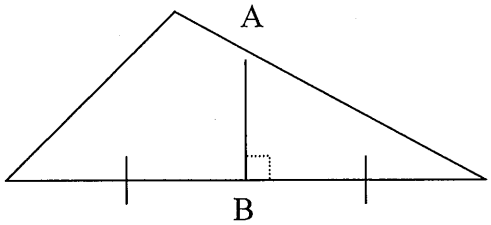
$3y + 7 = 4y$

$7 = y$

y = 7

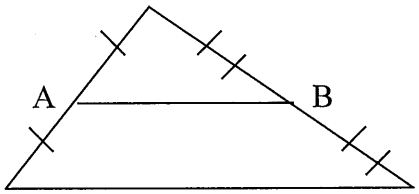
Is segment AB a *midsegment*, *perpendicular bisector*, *angle bisector*, *median*, *altitude*, or *none of these*?

47)



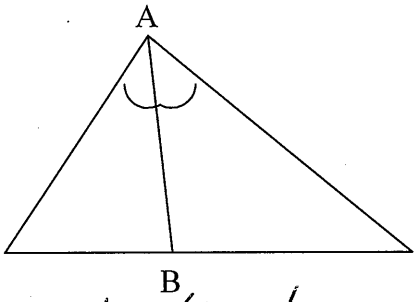
perpendicular bisector

48)



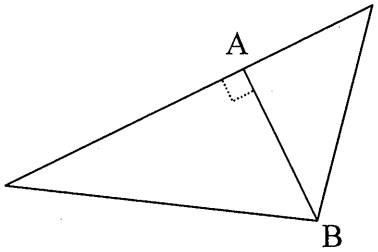
midsegment

49)



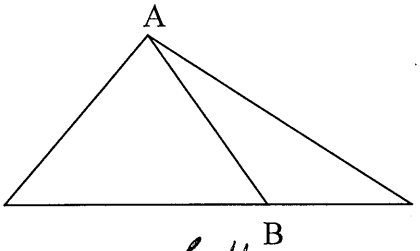
angle bisector

50)



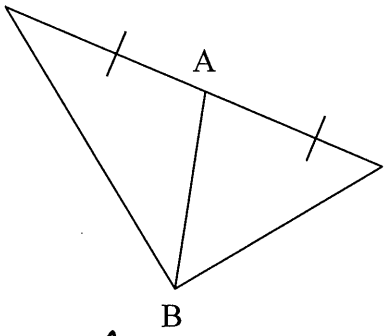
Altitude

51)



none of these

52)



median