Name:_____ Date:_____

UNIT 1 **LESSON 8**

Do Now: Solve algebraically for x: $3(x+1)-5x=12-(6x-7)$

$3x+3-5x=12-6x+7$

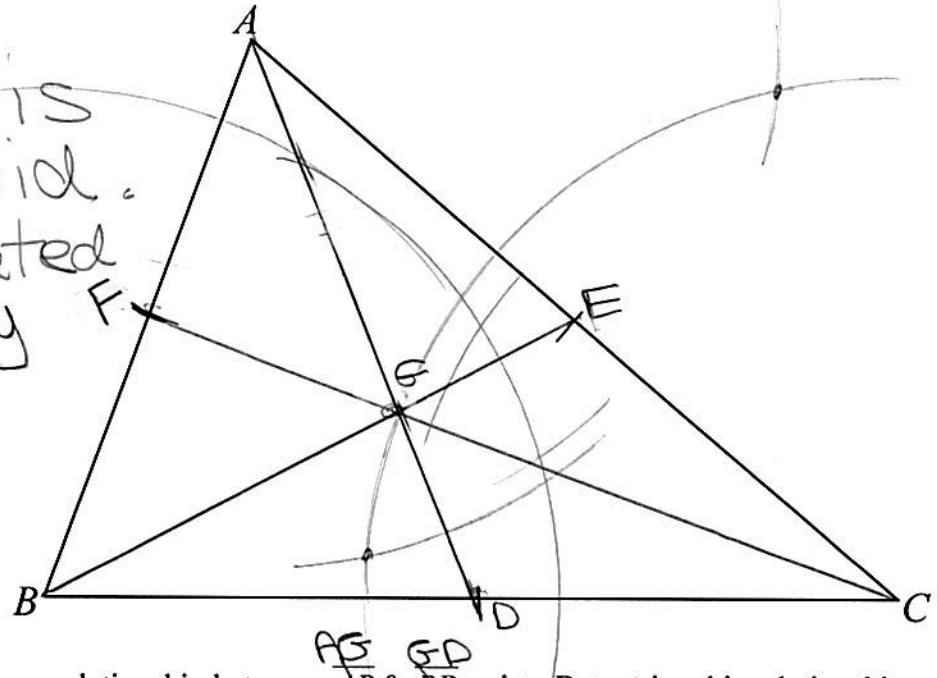
$-2x+3=19-6x$

$+6x \quad -3 \quad -3 \quad +6x$

$\frac{4x}{4}=\frac{16}{4}$ $x=4$

Aim: Centroid

1. Directions: Given the diagram of $\triangle ABC$ below, construct medians $\overline{AD}$, $\overline{BF}$ and $\overline{CG}$. Label the point of concurrency P.



Point G is the centroid. Always located inside any triangle

a) Based on your construction, a relationship between $\overline{AP}$ & $\overline{PD}$ exist. Determine this relationship.

b) Does this relationship exist with the other two medians?

AG GD

↓using your compass

the centroid divides the length of each median in a ratio of 2:1. the segment closer to the vertex is twice as long as the other segment.

centroid is the concurrencies of all three medians. It always

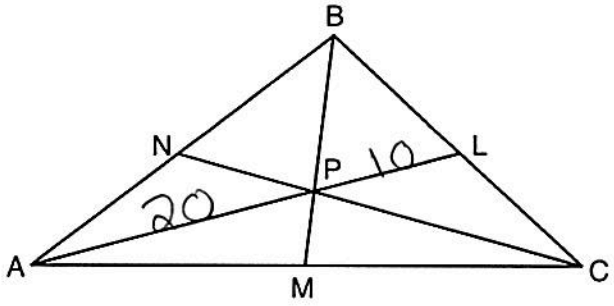
centroid is the center of gravity of the triangle

Practice Problems

2. In the diagram below, point P is the centroid of ΔABC. If $LP = 10$, What is the value of AP?

10(2)

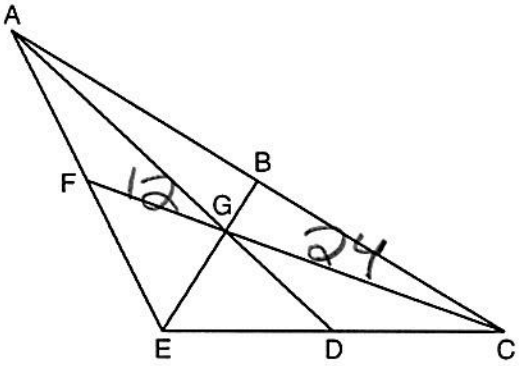
20 = LP



3. In the diagram below of ΔACE, medians $\overline{AD}$, $\overline{EB}$, and $\overline{CF}$ intersect at G. The length of $\overline{GC}$ is 24 cm. What is the length, in centimeters, of $\overline{FG}$?

$FG = \frac{1}{2}(24)$

FG = 12



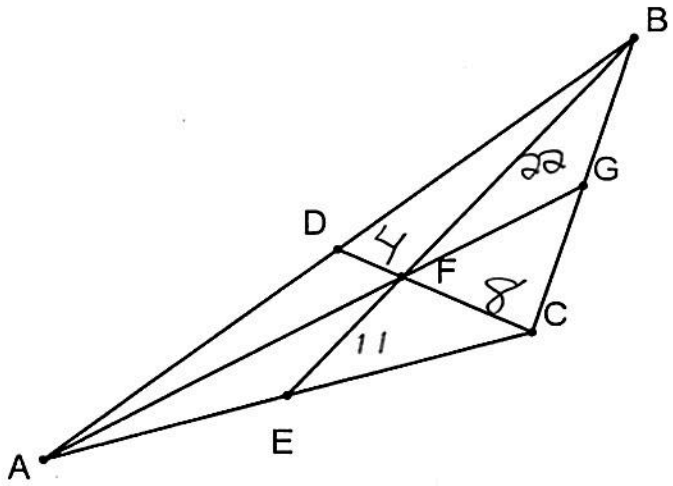
4. In the diagram of ΔABC below, point F is the centroid of ΔABC. If $DF = 4$ and $BF = 22$, determine each of the following measures.

A. $FC =$ 8

B. $DC =$ 12

C. $EF =$ 11

D. $BE =$ 33



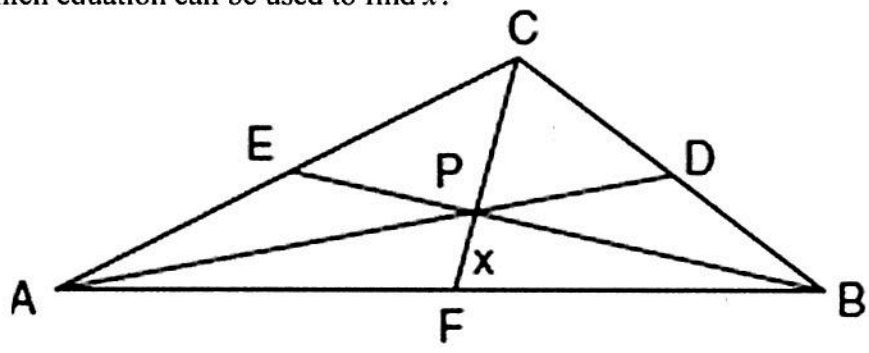
5. In the diagram of ΔABC below, Jose found centroid P by constructing the three medians. He measured $\overline{CF}$ and found it to be 6 inches. If $PF = x$, which equation can be used to find x?

1) $x + x = 6$

2) $2x + x = 6$

3) $3x + 2x = 6$

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



6. In the diagram below of ΔTEM, medians $\overline{TB}$, $\overline{EC}$, and $\overline{MA}$ intersect at D, and $TB = 9$. Find the length of $\overline{TD}$.

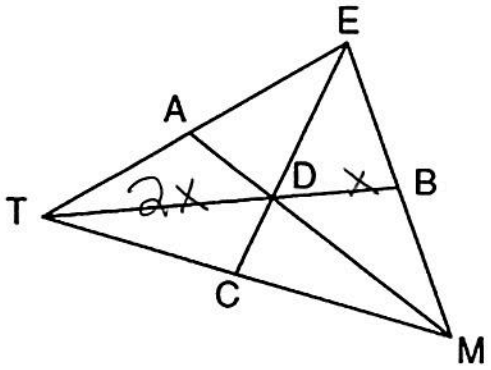
$2x + x = 9$

$3x = 9$

$x = 3$

$TD = 2(3)$

$\boxed{TD = 6}$



7. In the diagram below, point P is the centroid of ΔABC. If $PM = 2x + 5$ and $BP = 7x + 4$, what is the length of $\overline{PM}$?

$2PM = BP$

$2(2x+5) = 7x+4$

$4x + 10 = 7x + 4$

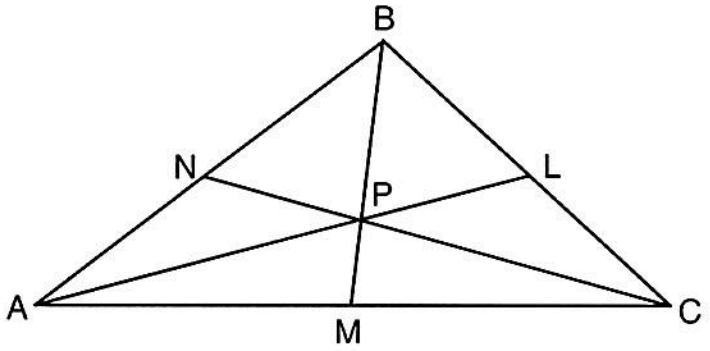
$-4x \qquad -4x$

$10 = 3x + 4$

$-4 \qquad -4$

$\frac{6}{3} = \frac{3x}{3}$

$2 = x$



$2(2)+5$

$4+5$

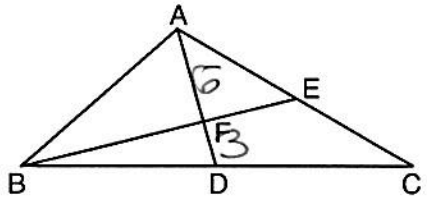
$\boxed{9 = PM}$

Name:_____ Date:_____

UNIT 1 **LESSON 8**

HW

1. In the diagram of $\triangle ABC$ below, medians $\overline{AD}$ and $\overline{BE}$ intersect at point F.

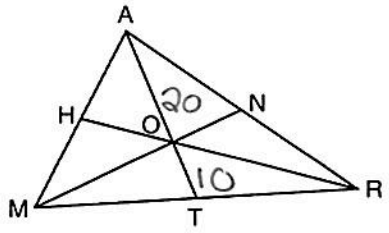


If $AF = 6$, what is the length of $\overline{FD}$?

$\frac{1}{2}(6) = FD$

$3 = FD$

2. In the diagram below of $\triangle MAR$, medians $\overline{MN}$, $\overline{AT}$, and $\overline{RH}$ intersect at O.



If $TO = 10$, what is the length of $\overline{TA}$?

$AO = 2(10)$

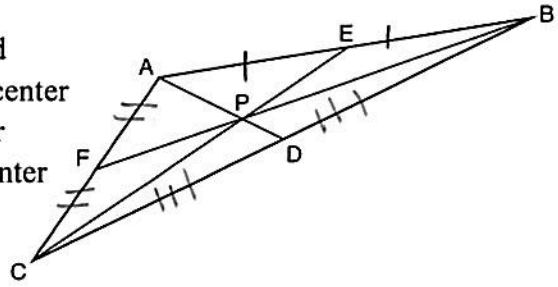
$AO = 20$

$TA = 10 + 20$

$TA = 30$

3. In the diagram below of $\triangle ABC$, $\overline{AE} \cong \overline{BE}$, $\overline{AF} \cong \overline{CF}$, and $\overline{CD} \cong \overline{BD}$. Point P must be the

1) centroid
2) circumcenter
3) incenter
4) orthocenter



4. The three medians of a triangle intersect at a point. Which measurements could represent the segments of one of the medians?

1) 2 and 3
2) 3 and 4.5
3) 3 and 6
4) 3 and 9

5. In the diagram below, $\overline{QM}$ is a median of triangle PQR and point C is the centroid of triangle PQR. If $QC = 5x$ and $CM = x + 12$. Determine and state the length of $\overline{QM}$.

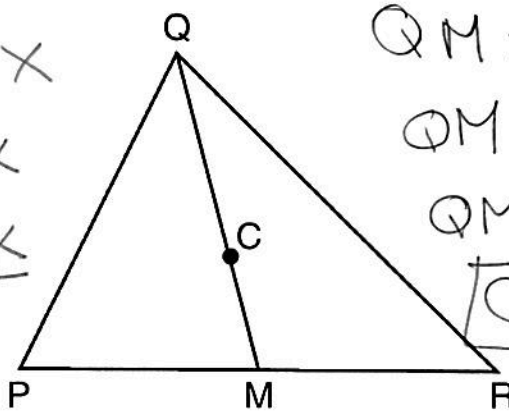
$2(x+12) = 5x$

$2x + 24 = 5x$

$-2x \quad -2x$

$\frac{24}{3} = \frac{3x}{3}$

$8 = x$



$QM = 6x + 12$

$QM = 6(8) + 12$

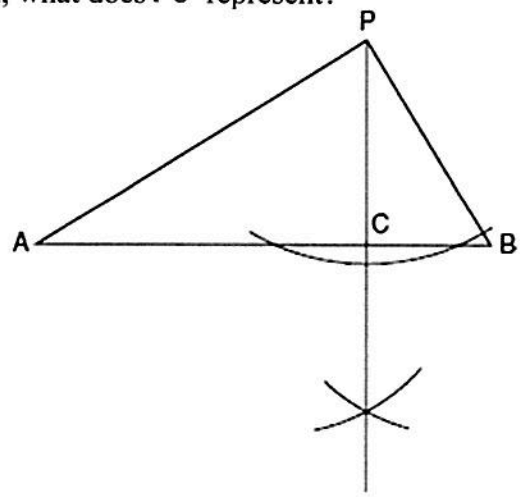
$QM = 48 + 12$

$QM = 60$

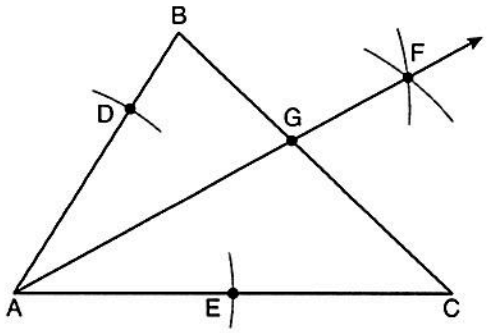
TURN OVER

6. In the accompanying diagram of a construction, what does $\overline{PC}$ represent?

1) an altitude drawn to $\overline{AB}$
2) a median drawn to $\overline{AB}$
3) the bisector of $\angle APB$
4) the perpendicular bisector of $\overline{AB}$



7. As shown in the diagram below of ΔABC, a compass is used to find points D and E, equidistant from point A. Next, the compass is used to find point F, equidistant from points D and E. Finally, a straightedge is used to draw $\overrightarrow{AF}$. Then, point G, the intersection of $\overrightarrow{AF}$ and side $\overline{BC}$ of ΔABC, is labeled.



Which statement must be true?

1) $\overrightarrow{AF}$ bisects side $\overline{BC}$
2) $\overrightarrow{AF}$ bisects $\angle BAC$
3) $\overrightarrow{AF} \perp \overline{BC}$
4) $\Delta ABG \sim \Delta ACG$