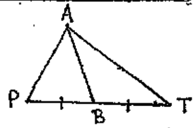
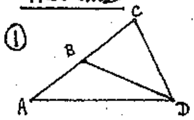
$\ast$ $\boxed{\text{median of a } \triangle}$ – a segment from a vertex to the midpoint of the opposite side



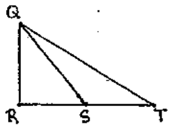
$\overline{AB}$ is a median for $\triangle PAT$

• every $\triangle$ has 3 medians located in the interior of the $\triangle$

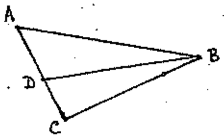
Problems:

① 

$\overline{BD}$ is a median.
$AC = 42$, $BC = 2x+3$
$x =$ ___, $AB =$ ___

② 

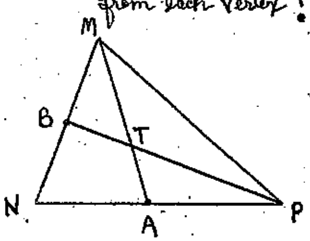
$\overline{QS}$ is a median.
$RS = 2x-1$
$RT = 3x+3$
$x =$ ___

③ 

$\overline{BD}$ is a median.
$AD = 5x+12$
$DC = 8x-15$
$AC =$ ___

④ $\triangle ABC$ has vertices $A(-3,10)$, $B(9,2)$, and $C(9,15)$.
Determine the coordinates of P so that $\overline{CP}$ is a median of $\triangle ABC$.

• the medians intersect at a point located $\underline{\underline{2/3}}$ the distance from each vertex!



$\overline{MA}$ and $\overline{PB}$ are medians

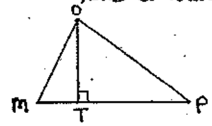
① $PB = 36$, so $PT =$ ___

② $MA = 21$, so $TA =$ ___

③ $TB = 5$, so $PB =$ ___

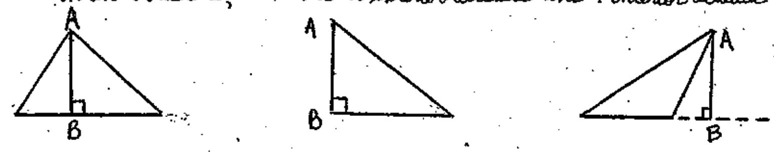
④ $AT = 9$, so $TM =$ ___

$\ast$ $\boxed{\text{altitude of a } \triangle}$ – a segment from a vertex $\perp$ to the line containing the opposite side



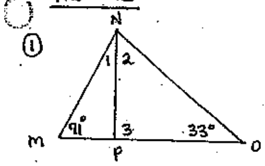
$\overline{OT}$ is an altitude for $\triangle MOP$

• every $\triangle$ has 3 altitudes
• in an acute $\triangle$, all 3 altitudes are interior
• in a right $\triangle$, one altitude is in the interior and the other 2 altitudes are the legs
• in an obtuse $\triangle$, there are 2 exterior altitudes and 1 interior altitude

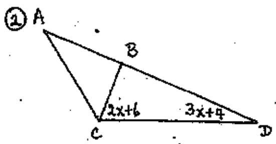


$\overline{AB}$ is an altitude for each triangle above

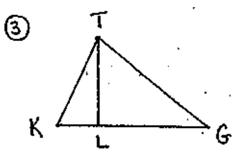
Problems:

① 

$\overline{NP}$ is an altitude for $\triangle MNO$.
Find $m\angle 1$, $m\angle 2$, $m\angle 3$.

② 

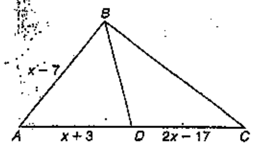
$\overline{BC}$ is an altitude for $\triangle ACD$.
$x =$ ___

③ 

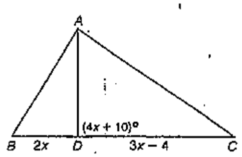
$\overline{TL}$ is an altitude for $\triangle KTG$.
$m\angle LTG = 63$ and $m\angle G = 2x-1$
$x =$ ___

Geometry (5.2-3) Special Segments in a $\triangle$ Name ________

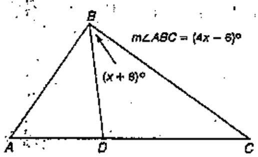
1. Find AB if $\overline{BD}$ is a median of $\triangle ABC$.



2. Find BC if $\overline{AD}$ is an altitude of $\triangle ABC$.

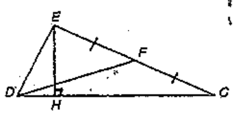


3. Find $m\angle ABC$ if $\overline{BD}$ is an angle bisector of $\triangle ABC$.



4. $\triangle TRE$ has vertices $T(3, 6)$, $R(-3, 10)$, and $E(-9, 4)$. Find the coordinates of point M if $\overline{TM}$ is a median of $\triangle TRE$.

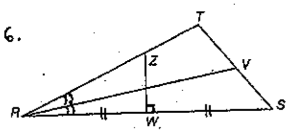
5.



a) ____ is an altitude for $\triangle$ DEC.

b) ____ is a median for $\triangle$ DEC.

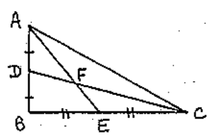
6.



a) ____ is an angle bisector of $\triangle$ RST.

b) ____ is a $\perp$ bisector of $\overline{RS}$.

7.



a) $\overline{AE}$ and $\overline{CD}$ are ________ for $\triangle$ ABC.

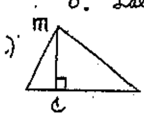
b) If DC = 45, then DF = ____ and CF = ____.

c) If AE = 18, then AF = ____ and FE = ____.

d) If FC = 20, then DF = ____ and CD = ____.

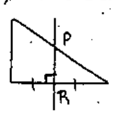
8. Label as a median, $\perp$ bisector, $\angle$ bisector, or altitude.

a)



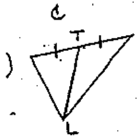
$\overline{MC}$ is a(n) ________

c)



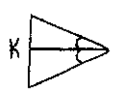
$\overline{PR}$ is a(n) ________

b)



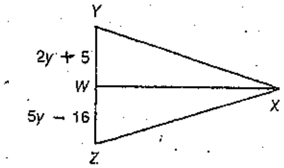
$\overline{TL}$ is a(n) ________

d)

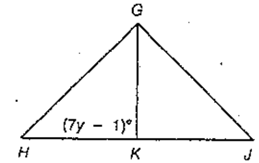


$\overline{KA}$ is a(n) ________

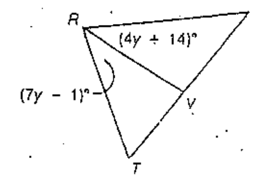
9. Find y if $\overline{XW}$ is a median of $\triangle XYZ$.



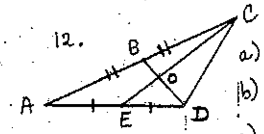
10. Find y if $\overline{GK}$ is an altitude of $\triangle GHJ$.



11. Find y if $\overline{VR}$ is an angle bisector of $\triangle RST$.



12.

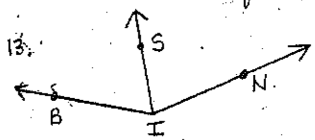


a) $\overline{DB}$ and $\overline{CE}$ are ________.

b) If CE = 48, then CO = ____.

c) If DB = 33, then BO = ____.

13.

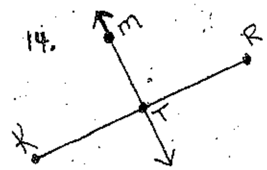


If $\overrightarrow{IS}$ bisects $\angle$ BIN, then . . .

(a) $\angle$ BIS $\cong \angle$ ____

(b) S is equidistant from ____ and ____

14.



If $\overleftrightarrow{MT}$ is the $\perp$ bisector of $\overline{KR}$, then . . .

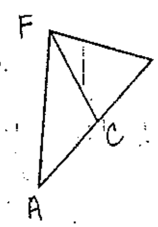
(a) m$\angle$MTR = ____

(b) RM = ____

(c) $\overline{TK} \cong$ ____

(d) T is the midpt of ____

15.



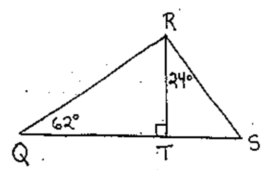
$\overline{FC}$ is a median.

(a) AC = 3x + 2 and DC = 2x + 5

x = ____

(b) AD = ____

16.



(a) Name the altitude for $\triangle$ QRS. ____

(b) m$\angle$QRT = ____

(c) m$\angle$S = ____

(d) m$\angle$RTS = ____

(e) m$\angle$QRS = ____