Write answers in the spaces provided.  
Show all work!

1. Sketch each of the special triangle segments listed.
   A. median from A  
   B. altitude from A  
   C. perpendicular bisector to $\overline{AB}$  
   D. angle bisector from A

2. Which of the following may not contain a vertex of a triangle?
   A. perpendicular bisector  
   B. median  
   C. altitude  
   D. angle bisector

For questions 3-6, state whether each sentence is sometimes, always, or never true.

3. Every triangle has 3 medians.

4. If $\overline{AM}$ is an altitude of $\triangle ABC$, then $\overline{AM}$ is also a median.

5. Each leg of a right $\triangle ABC$ is an altitude of $\triangle ABC$.

6. The 3 angle bisectors of a triangle intersect at a point outside the triangle.

7. In $\triangle ABC$, $\angle ABC = 75^\circ$ and $\angle C = 40^\circ$. If $\overline{BP}$ bisects $\angle ABC$ and $\overline{BQ}$ is an altitude, what is the measure of each of the following angles?
   A. $\angle PBC = $  
   B. $\angle CAB = $  
   C. $\angle BQA = $

Questions 8-9 refer to the diagram at right.

8. If $\overline{EG}$ is a median of $\triangle DEF$, then $x = $

9. If $\overline{EG}$ is an altitude of $\triangle DEF$, then $y =$
For questions 10-13, use the figure below to determine which is a true statement for the given information.

10. $YW$ is an angle bisector.
   A. $\angle YWZ$ is a right angle  
   B. $\angle XYW \cong \angle ZYW$
   C. $XW = WZ$  
   D. $XY = ZY$

11. $YW$ is an altitude.
   A. $\angle YWZ$ is a right angle  
   B. $\angle XYW \cong \angle ZYW$
   C. $XW = WZ$  
   D. $XY = ZY$

12. $YW$ is a median.
   A. $\angle YWZ$ is a right angle  
   B. $\angle XYW \cong \angle ZYW$
   C. $XW = WZ$  
   D. $XY = ZY$

13. $YW$ is a perpendicular bisector.
   A. $\angle YWZ$ is a right angle  
   B. $XW = WZ$
   C. Both A and B  
   D. none of these

14. Identify the **largest angle** of $\triangle ABC$.

15. Identify the **longest side** of $\triangle ABC$.

16. In $\triangle RST$, $m \angle R = x + 10$, $m \angle S = x + 5$, $m \angle T = 3x - 35$.
   List the sides in order from **longest** to **shortest**.

17. Determine whether it is possible to draw a triangle with the given side lengths.  
   (Yes or No)
   A. 2, 6, 3  
   B. 4, 6, 3  
   C. 3, 10, 13

18. a. Two sides of a triangle have lengths 7 and 10. The length of the third side must be greater than ____ and less than _______.

   b. Two sides of a triangle have lengths 6 and 12. The length of the third side must be greater than ____ and less than _______.
20. Using the diagram, complete the following statement with $=,$ $>, $ or $<$

$$TU \quad \____ \quad UV$$

21. Name the **shortest** side in the given figure if $AB = CB = BD$.

$$AD \quad \____ \quad DC$$

22. In the given figure, which angle is **larger**? $\angle DBC$ or $\angle ADB$?

*State the inequality theorem used to justify this.*

23. Identify the largest angle in each of the following triangles.

$$\angle A, \quad \angle B, \quad \text{or} \quad \angle C$$

24. Identify the longest side in each of the following triangles.

$$\text{AB, AC, or BC}$$
25. Find the missing measures if $\overline{RN}$, $\overline{NE}$, and $\overline{RE}$ are midsegments of triangle AOG.

\[ \begin{align*}
\text{EN} & = 22 \\
\text{OG} & = 43 \\
\text{RE} & = 18
\end{align*} \]

\[ \begin{align*}
a) \text{RA} & = \\
b) \text{GA} & = \\
c) \text{RN} & = \\
d) m \angle \text{REO} & = \\
e) m \angle \text{ERN} & = \\
\end{align*} \]

26. Find the measure of each numbered angle.

- $DF$ is an altitude of $\triangle BFD$
- $DE$ is an altitude of $\triangle CED$
- $AD$ is an altitude of $\triangle ABC$

\[ \begin{align*}
\text{A} & \quad \text{D} \\
\text{B} & \quad \text{E} \\
\text{C} & \quad \text{F}
\end{align*} \]

\[ \begin{align*}
m \angle 1 & = \\
m \angle 2 & = \\
m \angle 3 & = \\
m \angle 4 & = \\
m \angle 5 & = \\
m \angle 6 & = \\
\end{align*} \]

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

\[ \begin{align*}
\text{A} & \quad \text{B} \\
\text{C} & \quad \text{D}
\end{align*} \]

\[ \begin{align*}
x & = \\
m \angle ABC & = \\
\end{align*} \]

28. $\overline{AC}$ is a median. Find $x$.

\[ \begin{align*}
\text{A} & \quad \text{B} \\
\text{C} & \quad \text{D}
\end{align*} \]

\[ \begin{align*}
x & = \\
\end{align*} \]

29. $\overline{AC}$ is an altitude. Find $x$.

\[ \begin{align*}
\text{A} & \quad \text{B} \\
\text{C} & \quad \text{D}
\end{align*} \]

\[ \begin{align*}
x & = \\
\end{align*} \]

30. $\overline{AC}$ and $\overline{BC}$ are angle bisectors. Find the following measures.

\[ \begin{align*}
\text{D} & \quad \text{C} \\
\text{B} & \quad \text{A}
\end{align*} \]

\[ \begin{align*}
m \angle CAD & = \\
m \angle CBA & = \\
\end{align*} \]
31. In each diagram, identify the drawn segment as a perpendicular bisector, a median, an altitude, or angle bisector.

33. Write an inequality and solve it for the possible values of x.
A) \[48 \leq 45\]
B) \[10 \leq 12\]

34. Select the correct word for the following statements:
Orthocenter, incenter, circumcenter, centroid.
34) The point where the 3 angle bisectors are concurrent.
35) The point where the 3 medians are concurrent.
36) The point where the 3 altitudes are concurrent.
37) The point where the 3 perpendicular bisectors are concurrent.

38. \[DF\] is a perpendicular bisector of \(\Delta ABC\).
Find the following:
\[x=\quad y=\quad AC=\quad\]

39. If \(PT, TI, and TG\) are perpendicular bisectors:
WT = 14, CO = 25, WP = 13, and \(m\angle TGO = 4z + 14\)
find the following:
\[z=\quad CI=\quad PC=\quad TO=\quad CT=\quad\]
40. In $\triangle ABC$, $XB = 18$, $AW = 10$, $WY = 12$, $CB = 50$, and $XA = 8$.

W is the ______________________ of $\triangle ABC$.

$WZ = ______$

$CY = ______$

$ZB = ______$

$AC = ______$

$XW = ______$