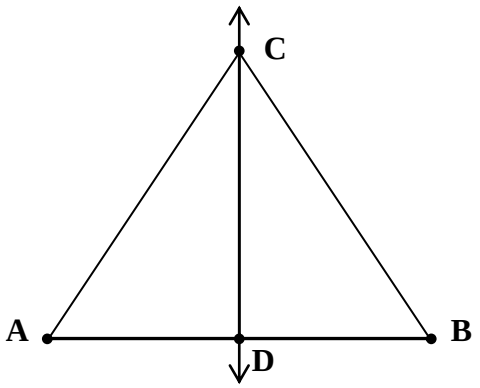
4.6 Special Segments in Triangles
Worksheet

Name: _____
Date: _____ Period: _____

For #1-5, use the figure at the right. In the figure, $\overleftrightarrow{CD}$ is the perpendicular bisector of $\overline{AB}$.

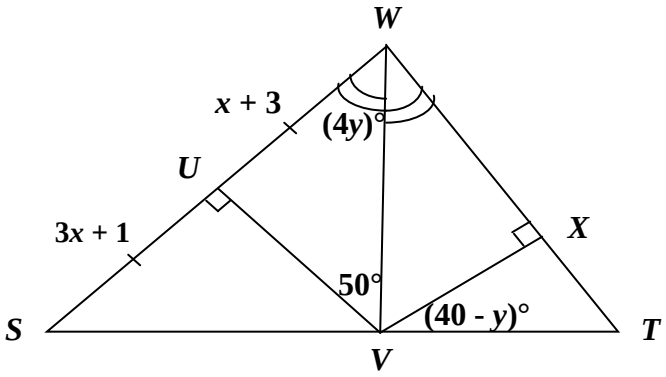
1. What is the relationship between *AD* and *AB*?
2. What is the relationship between $m\angle ADC$ and $m\angle BDC$?
3. What is the relationship between AC and CB?
4. What type of triangle is ΔABC?
5. TRUE or FALSE: $\overline{AC} \cong \overline{AD}$.



For #1-5.

For #6-10, use the figure at the right to find each measure. In the figure, $\overline{UV}$ is a perpendicular bisector of $\overline{SW}$, and $\overline{WV}$ is an angle bisector of $\angle SWT$.

6. *SU* = _____
7. $m\angle VWX$ = _____
8. $m\angle WVX$ = _____
9. $m\angle XTV$ = _____
10. $m\angle XVT$ = _____



For #6-10.

For #11-14, complete the statement using *always*, *sometimes*, or *never*.

11. A median _____ has a midpoint as an endpoint.
12. An altitude _____ lies outside a triangle.
13. A perpendicular bisector _____ has a vertex as an endpoint.
14. The angle bisectors of a triangle _____ intersect at a single point.

For #15-19, use the map of the Bermuda Triangle (at the right) and the given information to decide whether $\overline{OB}$ is a ***perpendicular bisector***, an ***angle bisector***, a ***median*** or an ***altitude*** of ΔMBP.

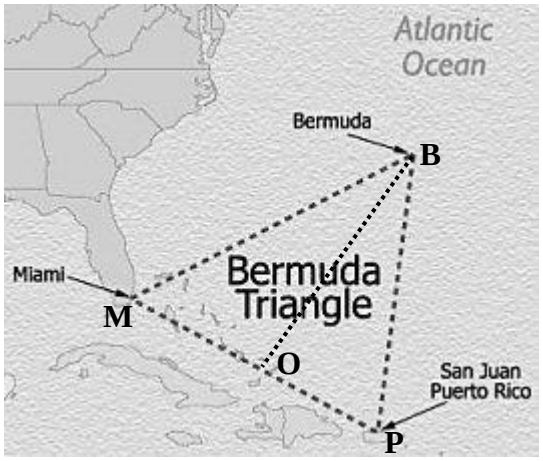
15. If $\overline{MO} \cong \overline{OP}$, then $\overline{OB}$ is a(n) _____ of ΔMBP.

16. If $\overline{OB} \perp \overline{MP}$, then $\overline{OB}$ is a(n) _____ of ΔMBP.

17. If $\angle MBO \cong \angle PBO$, then $\overline{OB}$ is a(n) _____ of ΔMBP.

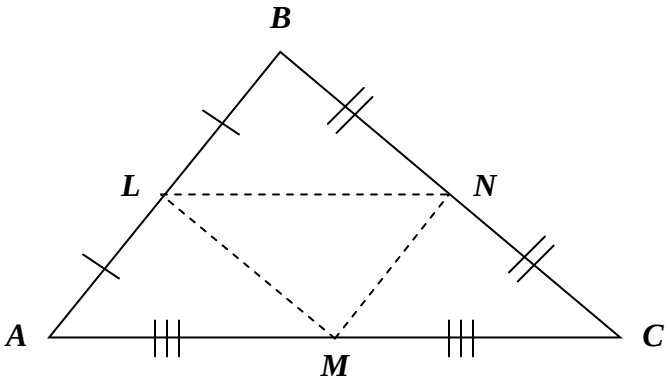
18. If $\overline{OB} \perp \overline{MP}$ and $\overline{MO} \cong \overline{OP}$, then $\overline{OB}$ is a(n) _____ of ΔMBP.

19. If $\overrightarrow{BO}$ bisects $\angle MBP$, then $\overline{OB}$ is a(n) _____ of ΔMBP.



For #15-19.

For #20-27, consider the triangle below. In ΔABC, the midpoints of the sides are L, M, and N.



For #20-27.

20. $\overline{LM} \parallel$ _____

21. $\overline{AB} \parallel$ _____

22. If $AC = 14$, then $LN =$ _____.

23. If $MN = 8$, then $AB =$ _____.

24. If $NC = 3$, then $LM =$ _____.

25. If $LN = 5$, then _____ $= 10$.

26. If $LM = 3x + 1$ and $BC = 10x - 6$, then $LM =$ _____.

27. If $NM = x - 1$ and $AB = 3x - 7$, then $AB =$ _____.

For #28-30, decide whether the statement is *true* or *false*. Illustrate your answer with a sketch.

28. A perpendicular bisector can also be an altitude.

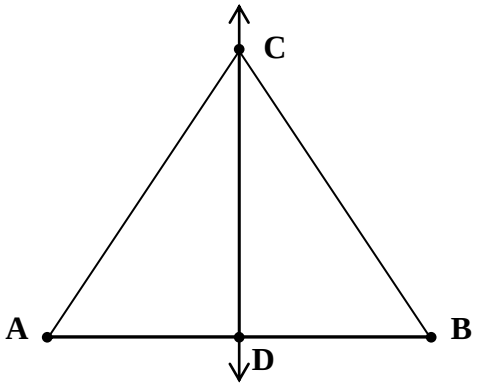
29. An angle bisector cannot be a median.

30. In a triangle, one segment can be a perpendicular bisector, an angle bisector, a median AND an altitude.

Special Segments in Triangles
Worksheet

Name: **ANSWERS**
Date: _____ Period: _____

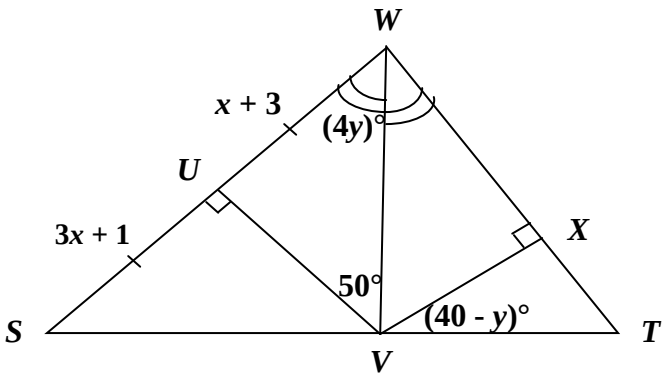
For #1-5, use the figure at the right. In the figure, $\overleftrightarrow{CD}$ is the perpendicular bisector of $\overline{AB}$.



For #1-5.

1. What is the relationship between *AD* and *AB*?
   $AD = \frac{1}{2}\ AB$
2. What is the relationship between $m\angle ADC$ and $m\angle BDC$?
   $m\angle ADC = m\angle BDC = 90°$
3. What is the relationship between AC and CB?
   $AC = BC$
4. What type of triangle is ΔABC?
   isosceles
5. TRUE or FALSE: $\overline{AC} \cong \overline{AD}$. FALSE

For #6-10, use the figure at the right to find each measure. In the figure, $\overline{UV}$ is a perpendicular bisector of $\overline{SW}$, and $\overline{WV}$ is an angle bisector of $\angle SWT$.



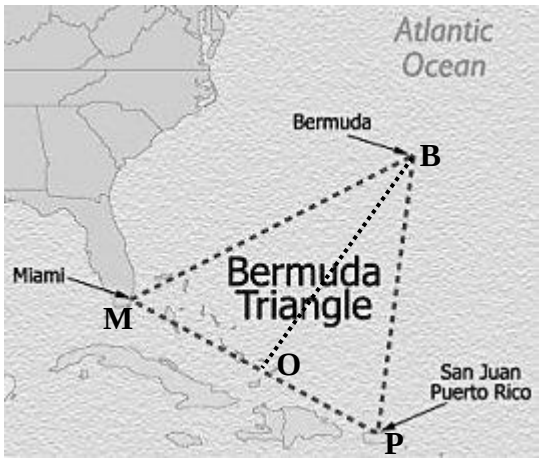
For #6-10.

6. $SU = 4$
7. $m\angle VWX = 40°$
8. $m\angle WVX = 50°$
9. $m\angle XTV = 60°$
10. $m\angle XVT = 30°$

For #11-14, complete the statement using *always*, *sometimes*, or *never*.

11. A median *ALWAYS* has a midpoint as an endpoint.
12. An altitude *SOMETIMES* lies outside a triangle.
13. A perpendicular bisector *SOMETIMES* has a vertex as an endpoint.
14. The angle bisectors of a triangle *ALWAYS* intersect at a single point.

For #15-19, use the map of the Bermuda Triangle (at the right) and the given information to decide whether $\overline{OB}$ is a *perpendicular bisector*, an *angle bisector*, a *median* or an *altitude* of ΔMBP.



For #15-19.

15. If $\overline{MO} \cong \overline{OP}$, then $\overline{OB}$ is a(n) *MEDIAN* of ΔMBP.

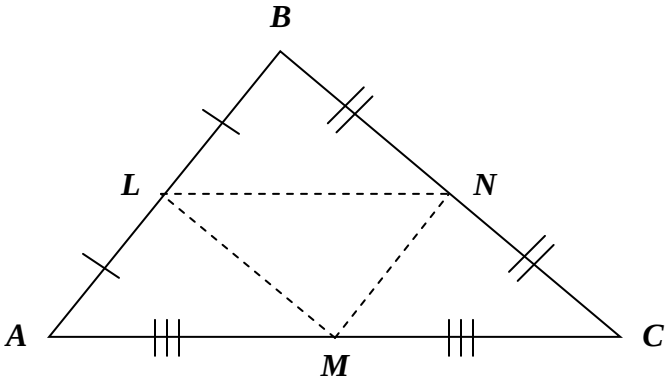
16. If $\overline{OB} \perp \overline{MP}$, then $\overline{OB}$ is a(n) *ALTITUDE* of ΔMBP.

17. If $\angle MBO \cong \angle PBO$, then $\overline{OB}$ is a(n) *ANGLE BISECTOR* of ΔMBP.

18. If $\overline{OB} \perp \overline{MP}$ and $\overline{MO} \cong \overline{OP}$, then $\overline{OB}$ is a(n) *PERPENDICULAR BISECTOR* of ΔMBP.

19. If $\overrightarrow{BO}$ bisects $\angle MBP$, then $\overline{OB}$ is a(n) *ANGLE BISECTOR* of ΔMBP.

For #20-27, consider the triangle below. In ΔABC, the midpoints of the sides are L, M, and N.



For #20-27.

20.

21.

22. If $AC = 14$, then $LN =$.

23. If $MN = 8$, then $AB =$.

24. If $NC = 3$, then $LM =$.

25. If $LN = 5$, then $\quad = 10$.

26. If $LM = 3x+1$ and $BC = 10x-6$, then LM = 8.

$$LM = \frac{1}{2}\ BC\ ;\ 3x+1 = 5x-3;\ 4 = 2x;\ 2 = x$$

$$LM = 3\ 2\ +2 = \boxed{8}$$

27. If $NM = x-1$ and $AB = 3x-7$, then AB = 8.

For #28-30, decide whether the statement is *true* or *false*. Illustrate your answer with a sketch.

28. A perpendicular bisector can also be an altitude. TRUE, in an isosceles triangle

29. An angle bisector cannot be a median. FALSE, it is in an isosceles triangle

30. In a triangle, one segment can be a perpendicular bisector, an angle bisector, a median AND an altitude.
TRUE, in an equilateral triangle