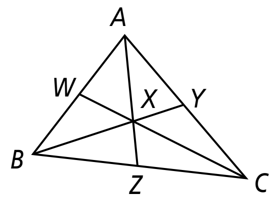
Name ______________________________ Class ____________ Date ____________

Practice

Form G

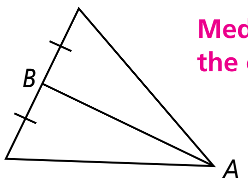
Medians and Altitudes

In △*ABC*, *X* is the centroid.

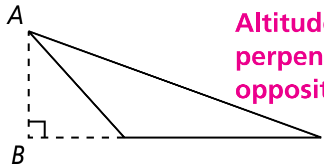


1. If $CW = 15$, find CX and XW. **$CX = 10$; $XW = 5$**
2. If $BX = 8$, find BY and XY. **$BY = 12$; $XY = 4$**
3. If $XZ = 3$, find AX and AZ. **$AX = 6$; $AZ = 9$**

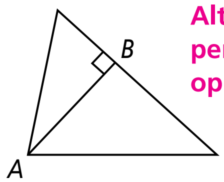
Is $\overline{AB}$ a *median*, an *altitude*, or *neither*? Explain.

4. 

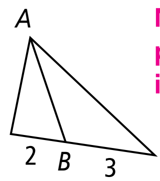
Median; $\overline{AB}$ bisects the opposite side.

5. 

Altitude; $\overline{AB}$ is perpendicular to the opposite side.

6. 

Altitude; $\overline{AB}$ is perpendicular to the opposite side.

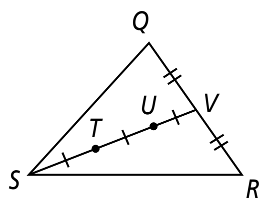
7. 

Neither; $\overline{AB}$ is not perpendicular to nor does it bisect the opposite side.

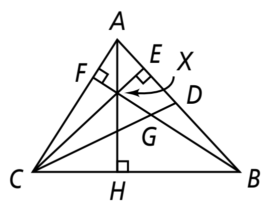
Coordinate Geometry **Find the orthocenter of △*ABC*.**

8. $A(2, 0)$, $B(2, 4)$, $C(6, 0)$ **(2, 0)**
9. $A(1, 1)$, $B(3, 4)$, $C(6, 1)$ **(3, 3)**

10. Name the centroid. ***U***

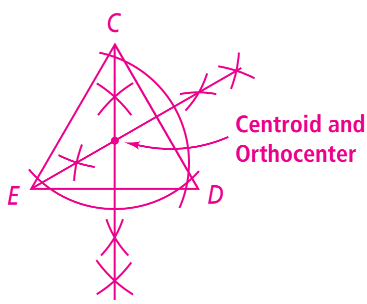


11. Name the orthocenter. ***X***

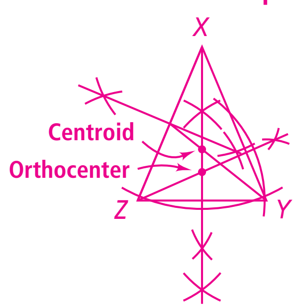


Draw a triangle that fits the given description. Then construct the centroid and the orthocenter.

12. equilateral △*CDE* **Sample: See art.**



13. acute isosceles △*XYZ* **Sample: See art.**

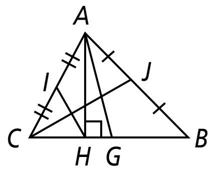


Name ________________________ Class ____________ Date ____________

Practice (continued) *Form G*

Medians and Altitudes

In Exercises 14–18, name each segment.



14. a median in $\triangle ABC$ $\overline{CJ}$

15. an altitude for $\triangle ABC$ $\overline{AH}$

16. a median in $\triangle AHC$ $\overline{IH}$

17. an altitude for $\triangle AHB$ $\overline{AH}$ or $\overline{BH}$

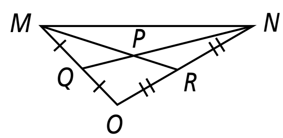
18. an altitude for $\triangle AHG$ $\overline{AH}$ or $\overline{GH}$

19. $A(0, 0)$, $B(0, -2)$, $C(-3, 0)$. Find the orthocenter of $\triangle ABC$. **(0, 0)**

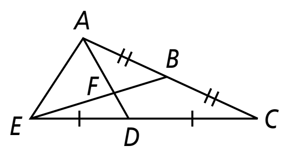
20. Cut a large isosceles triangle out of paper. Paper-fold to construct the medians and the altitudes. How are the altitude to the base and the median to the base related? **They are the same.**

21. In which kind of triangle is the centroid at the same point as the orthocenter? **equilateral**

22. P is the centroid of $\triangle MNO$. $MP = 14x + 8y$. Write expressions to represent PR and MR. $PR = 7x + 4y$; $MR = 21x + 12y$



23. F is the centroid of $\triangle ACE$. $AD = 15x^2 + 3y$. Write expressions to represent AF and FD. $AF = 10x^2 + 2y$; $FD = 5x^2 + y$



24. Use coordinate geometry to prove the following statement.

Given: $\triangle ABC$; $A(c, d)$, $B(c, e)$, $C(f, e)$

Prove: The circumcenter of $\triangle ABC$ is a point on the triangle.

Sample: The circumcenter is the intersection of the perpendicular bisectors of a triangle. The midpoints of $\overline{AB}$ and $\overline{BC}$ are $(c, \frac{d+e}{2})$ and $(\frac{c+f}{2}, e)$. So, the equations of their perpendicular bisectors are $x = \frac{c+f}{2}$ and $y = \frac{d+e}{2}$. Their intersection is $(\frac{c+f}{2}, \frac{d+e}{2})$, which is the midpoint of AC.