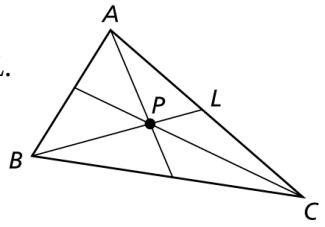
Name_____ Date _____

6.3 Practice A

In Exercises 1–4, point *P* is the centroid of $\triangle ABC$. Use the given information to find the indicated measures.

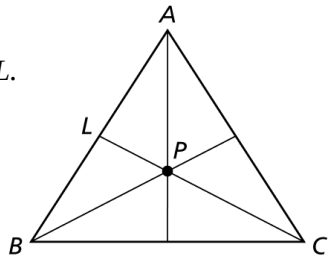
1. $BL = 12$

Find BP and PL.



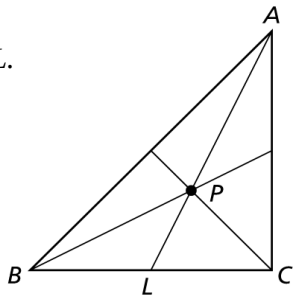
2. $CP = 16$

Find PL and CL.



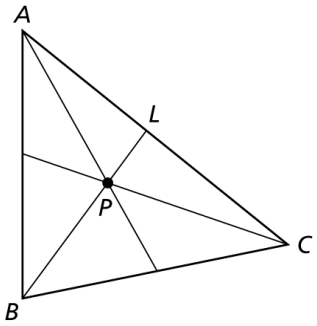
3. $AL = 27$

Find AP and PL.



4. $BP = 102$

Find PL and BL.



In Exercises 5 and 6, find the coordinates of the centroid of the triangle with the given vertices.

5. $Q(-2, 6)$, $R(4, 0)$, $S(10, 6)$

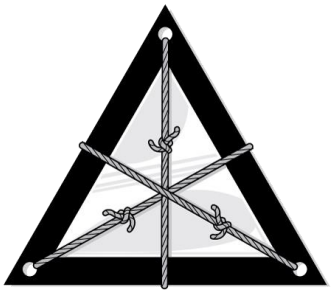
6. $U(3, 3)$, $V(5, -1)$, $W(-2, 1)$

In Exercises 7 and 8, tell whether the orthocenter is *inside*, *on*, or *outside* the triangle. Then find the coordinates of the orthocenter.

7. $J(1, 3)$, $K(-3, 1)$, $L(0, 0)$

8. $D(-3, -2)$, $E(-2, -2)$, $F(1, 2)$

9. To transport a triangular table, you remove the legs. You secure the glass top to the frame by looping a string from a hole in each vertex around the opposite side, then pulling it tight and tying it. At what point of concurrency do the three strings intersect? Explain your reasoning.



10. Your friend claims that it is impossible for the centroid and the orthocenter of a triangle to be the same point. Is your friend correct? Explain your reasoning.

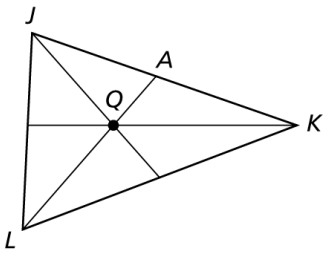
Name _____ Date _____

6.3 Practice B

In Exercises 1–3, point *Q* is the centroid of $\triangle JKL$. Use the given information to find the indicated segment lengths.

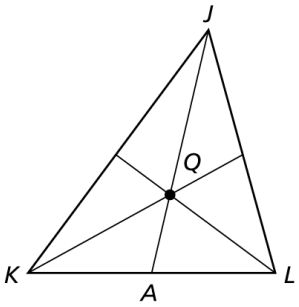
1. $AQ = 21$

Find QL and AL.



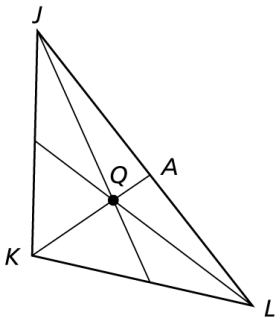
2. $JA = 72$

Find JQ and QA.



3. $KQ = 10$

Find QA and KA.



4. Find the coordinates of the centroid of the triangle with the vertices $A(-6, 8)$, $B(-3, 1)$, and $C(0, 3)$.

In Exercises 5 and 6, tell whether the orthocenter is *inside*, *on*, or *outside* the triangle. Then find the coordinates of the orthocenter.

5. $Q(-1, 5)$, $R(4, 3)$, $S(-1, -2)$

6. $L(4, 6)$, $M(-3, 2)$, $N(-2, -6)$

7. Given two vertices and the centroid of a triangle, how many possible locations are there for the third vertex? Explain your reasoning.

8. Given two vertices and the orthocenter of a triangle, how many possible locations are there for the third vertex? Explain your reasoning.

9. The centroid of a triangle is at $(2, -1)$ and vertices at $(3, -5)$ and $(-7, -4)$. Find the third vertex of the triangle.

10. The orthocenter of a triangle is at the origin, and two of the vertices of the triangle are at $(-5, 0)$ and $(3, 4)$. Find the third vertex of the triangle.

11. Your friend claims that it is possible to draw an equilateral triangle for which the circumcenter, incenter, centroid, and orthocenter are not all the same point. Do you agree? Explain your reasoning.

12. Your friend claims that when the median from one vertex of a triangle is the same as the altitude from the same vertex, the median divides the triangle into two congruent triangles. Do you agree? Explain your reasoning.

13. Can the circumcenter and the incenter of an obtuse triangle be the same point? Explain.