Constructing a Centroid

Task 1: Making the Midpoints
1. With a straight edge, draw a scalene triangle. Label the vertices T, R, and I.
2. Construct the midpoint of $\overline{TR}$. Call this point M.
3. Construct the midpoint of $\overline{TI}$. Call this point S.
4. Construct the midpoint of $\overline{RI}$. Call this point Q.
5. Using a centimeter ruler, measure and record the side lengths indicated in Table 1. Are M, S, and Q really midpoints? Support your answer with numbers.

Table 1: Triangle Measures:

TR	TI	RI	TM	MR	TS	SI	RQ	QI

Task 2: Making the Medians
6. Construct the three medians by creating segments $\overline{RS}$, $\overline{IM}$, and $\overline{TQ}$.
7. Call the point of intersection (called the centroid) C.
8. Measure and record the lengths indicated in Table 2. What numerical relationships do you notice in the three subgroups indicated in Table 2?

Table 2: Median Measures

RS	RC	CS	IM	IC	CM	TQ	TC	CQ

Task 3: Making Midsegments
9. Now let's make midsegments! Make segments $\overline{MS}$, $\overline{SQ}$, and $\overline{MQ}$. Find the 6 measures indicated in Table 3. What numerical relationships do you notice?
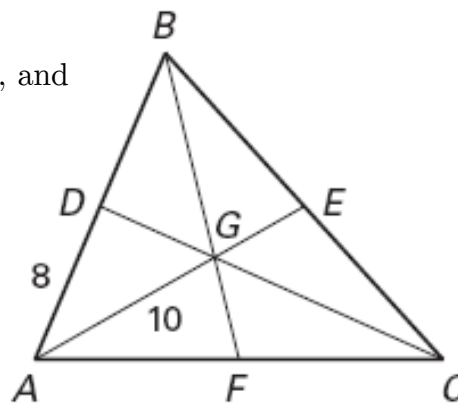
Table 3: Midsegment Measures

SM	IR	SQ	TR	MQ	TI

10. Now cut out ΔTRI and balance it on the tip of your finger. Where is the center of mass?

Task 4: Practice
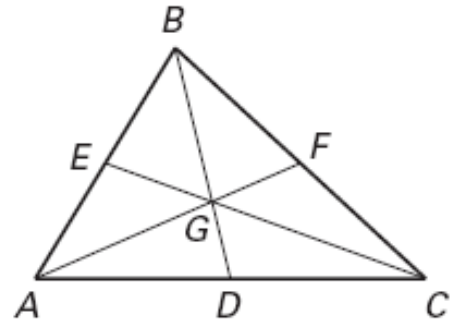Given that G is the centroid of the triangle and AD = 8, AG = 10, and
CD = 18. Find:

11. BD =

12. AB =

13. EG =

14. AE =

15. CG =

16. DG =

Use the given information and the diagram to find the value of x. It is given that G is the centroid.

17. $BG = 4x + 6 \qquad DG = 3x$

19. $GF = 3x - 2 \qquad AG = 5x$

18. $EG = 2x - 8 \qquad EC = 3x + 3$

Task 5: Coordinate Centroid Formula
As you saw during the balancing, the centroid can be considered the "middle" of a triangle. We made one on a blank plane, but how do you find the centroid on a coordinate grid? Let's find out.

20. How do you find the exact middle point between two points (x_1, y_1) and (x_2, y_2) on the coordinate plane?

21. How, then, would you expect to find the middle of *three* points, (x_1, y_1), (x_2, y_2), (x_3, y_3)?

Task 6: More Practice
22: Find the centroid of ΔABC where the points are
$A(-1,2)$ $B(5,6)$ and $C(5,-2)$.

Classwork/Homework:
p. 203-4: #1-2 (CO-C10b)