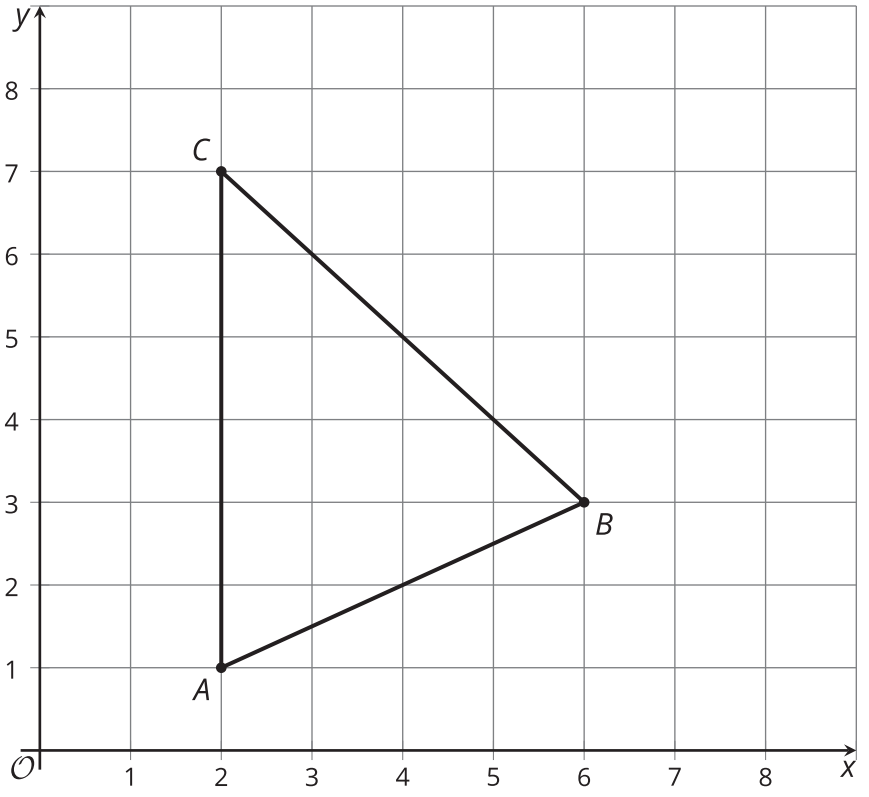
Unit 6 Lesson 16: Weighted Averages in a Triangle

1 Triangle Midpoints (Warm up)

Student Task Statement

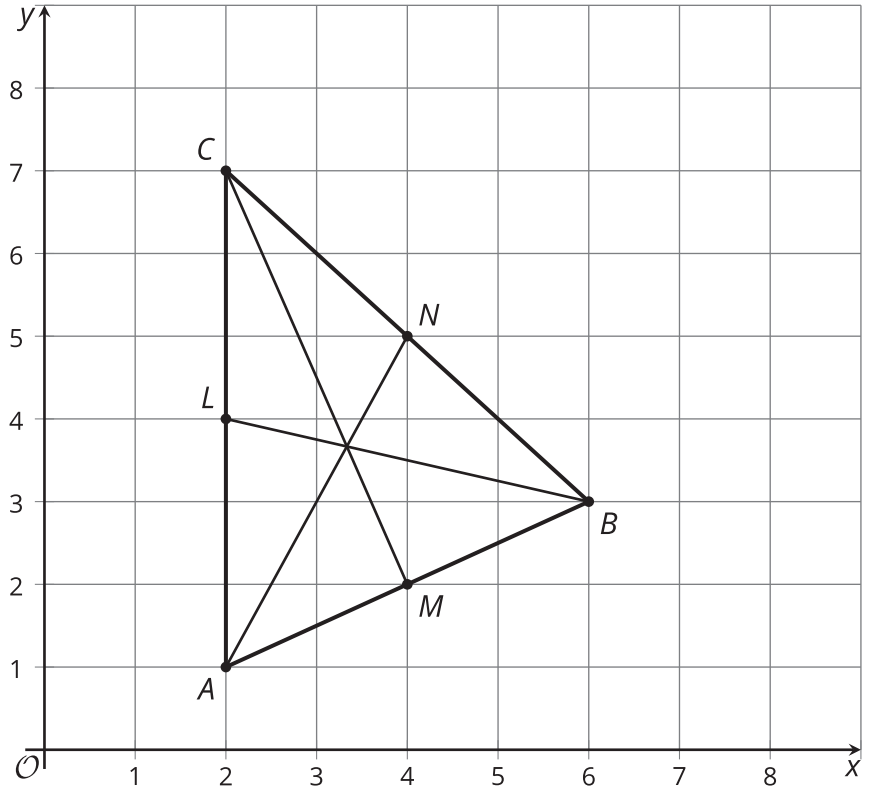
Triangle ABC is graphed.



Find the midpoint of each side of this triangle.

2 Triangle Medians

Images for Launch



Student Task Statement

Your teacher will tell you how to draw and label the **medians** of the triangle in the warm-up.

1. After the medians are drawn and labeled, measure all 6 segments inside the triangle using centimeters. What is the ratio of the 2 parts of each median?
2. Find the coordinates of the point that partitions segment AN in a $2:1$ ratio.
3. Find the coordinates of the point that partitions segment BL in a $2:1$ ratio.
4. Find the coordinates of the point that partitions segment CM in a $2:1$ ratio.

3 Any Triangle's Medians

Student Task Statement

The goal is to prove that the medians of any triangle intersect at a point. Suppose the vertices of a triangle are $(0, 0)$, $(w, 0)$, and (a, b).

1. Each student in the group should choose 1 side of the triangle. If your group has 4 people, 2 can work together. Write an expression for the midpoint of the side you chose.
2. Each student in the group should choose a median. Write an expression for the point that partitions each median in a $2 : 1$ ratio from the vertex to the midpoint of the opposite side.
3. Compare the coordinates of the point you found to those of your groupmates. What do you notice?
4. Explain how these steps prove that the 3 medians of any triangle intersect at a single point.