Determine the line equation of a median
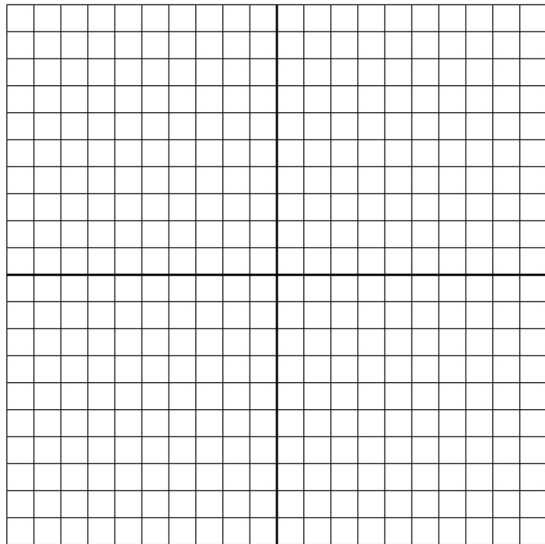
△ABC is defined by points A(1,8), B(5,1), and C(-5,-2). If E is the midpoint of $\overline{AC}$, find the equation of the line that contains the median $\overline{EB}$.

1. Plot the points of the triangle.
2. Find E, the midpoint of $\overline{AC}$, using the midpoint formula.

$$\left(\frac{x_1 + x_2}{2} , \frac{y_1 + y_2}{2} \right)$$

$$\left(\frac{1 + -5}{2} , \frac{8 + -2}{2} \right)$$

$$\left(\frac{-4}{2} , \frac{6}{2} \right)$$

$$E(-2 , 3)$$

3. Find the slope of $\overline{EB}$. $\dfrac{y_2 - y_1}{x_2 - x_1}$
   E(-2,3) and B(5,1)

$$\frac{1 - 3}{5 - -2} = \frac{-2}{7}$$

4. Use the slope of $\overline{EB}$ and point E or B in point-slope form.

$$y - y_1 = m(x - x_1)$$
$$y - 3 = -\tfrac{2}{7} (x + 2)$$

5. Convert to slope-intercept form.

$$y - 3 = -\tfrac{2}{7} (x + 2)$$
$$y - 3 = -\tfrac{2}{7} x - \tfrac{4}{7}$$
$$\underline{\; + 3 \qquad\quad + 3 \;}$$
$$y = -\tfrac{2}{7} x + 2\tfrac{3}{7}$$