Determine the line equation of an altitude
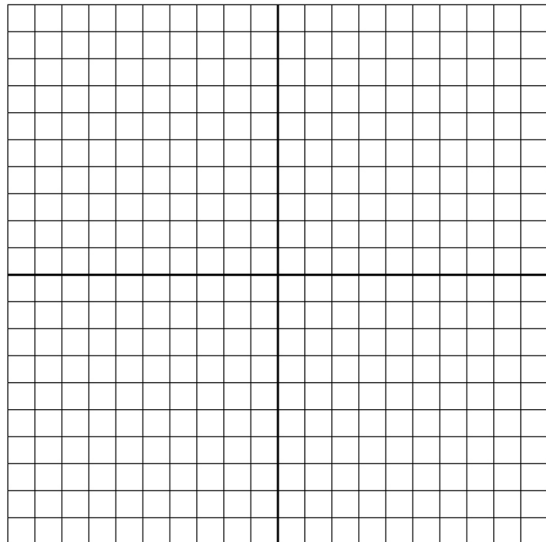
△GHK is defined by points G(-4,3), H(1,-2), and K(-7,-3). Find the equation of altitude $\overline{LH}$.

1. Plot the points of the triangle.
2. Find the slope of $\overline{GK}$.
   G(-4,3) and K(-7,-3)

$$\frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{-3 - 3}{-7 - -4} = \frac{-6}{-3} = 2$$

3. Find the slope perpendicular to the slope of $\overline{GK}$.

slope of $\overline{GK}$ slope of $\overline{LH}$
2          $\xrightarrow{\text{negative reciprocal}}$ $-\frac{1}{2}$

4. Use the slope of $\overline{LH}$ and point H(1,-2) in point-slope form.
   $y - y_1 = m(x - x_1)$
   $y + 2 = -\frac{1}{2}(x - 1)$

5. Convert to slope-intercept form.
   $y + 2 = -\frac{1}{2}(x - 1)$
   $y + 2 = -\frac{1}{2}x + \frac{1}{2}$
   $\underline{\quad - 2 \qquad\quad - 2 \quad}$
   $y = -\frac{1}{2}x - 1\frac{1}{2}$