1. Points (-2,2),(1,1).

$$\begin{aligned} 1 + \lambda < (-2,2),(1,1) > -\lambda < (-2,2),(-2,2) > -\gamma &= 0 \\ 1 + \lambda < (-2,2),(1,1) > -\lambda < 1,1),(1,1) > -\gamma &= 0 \end{aligned} \tag{1}$$

The above equation simplifies to:

$$\begin{aligned} 1 - 8\lambda - \gamma &= 0 \\ 1 - 2\lambda + \gamma &= 0 \end{aligned} \tag{2}$$

Solving above we get: $\lambda = 1/5, \ \gamma = -3/5 = b$

$$\begin{aligned} \bar{w} &= \lambda_1 \bar{x}_1 - \lambda_2 \bar{x}_2 \\ \bar{w} &= 1/5(-2,2), -1/5(1,1) = \left(\frac{-3}{5}, \frac{1}{5}\right) \end{aligned} \tag{3}$$

we can confirm the value of b

$$\begin{aligned} b &= 1- < \left(\frac{-3}{5}, \frac{1}{5}\right), (-2,2) >= 1 - \frac{8}{5} = -3/5 = \gamma \\ b &= -1- < \left(\frac{-3}{5}, \frac{1}{5}\right), (1,1) >= -1 - \frac{-2}{5} = -3/5 = \gamma \end{aligned} \tag{4}$$

2. Points (1,1).(4,3).

$$\begin{aligned} 1 + \lambda < (1,1),(4,3) > -\lambda < (1,1),(1,1) > -\gamma &= 0 \\ 1 + \lambda < (1,1),(4.3) > -\lambda < 4,3),(4,3) > -\gamma &= 0 \end{aligned} \tag{5}$$

The above equation simplifies to:

$$\begin{aligned} 1 + 5\lambda - \gamma &= 0 \\ 1 - 18\lambda + \gamma &= 0 \end{aligned} \tag{6}$$

Solving above we get: $\lambda = 2/13,\ \gamma = 23/13 = b$

$$\begin{aligned} \bar{w} &= \lambda_1 \bar{x}_1 - \lambda_2 \bar{x}_2 \\ \bar{w} &= 2/13(1,1) - 2/13(4/3) = \left(\frac{-6}{13}, \frac{-4}{13}\right) \end{aligned} \tag{7}$$

we can confirm the value of b

$$\begin{aligned} b &= 1 - < \left(\frac{-6}{13}, \frac{-4}{13}\right), (1,1) >= 1 - \frac{-10}{13} = 23/13 = \gamma \\ b &= -1 - < \left(\frac{-6}{13}, \frac{-4}{13}\right), (4,3) >= -1 - \frac{-36}{13} = 23/13 = \gamma \end{aligned} \tag{8}$$

3. Points (2,-2),(-1,1).

$$\begin{aligned} 1 + \lambda < (2,-2),(-1,1) > -\lambda < (2,-2),(2,-2) > -\gamma &= 0 \\ 1 + \lambda < (2,-2),(-1,1) > -\lambda < -1,1),(-1,1) > -\gamma &= 0 \end{aligned} \tag{9}$$

The above equation simplifies to:

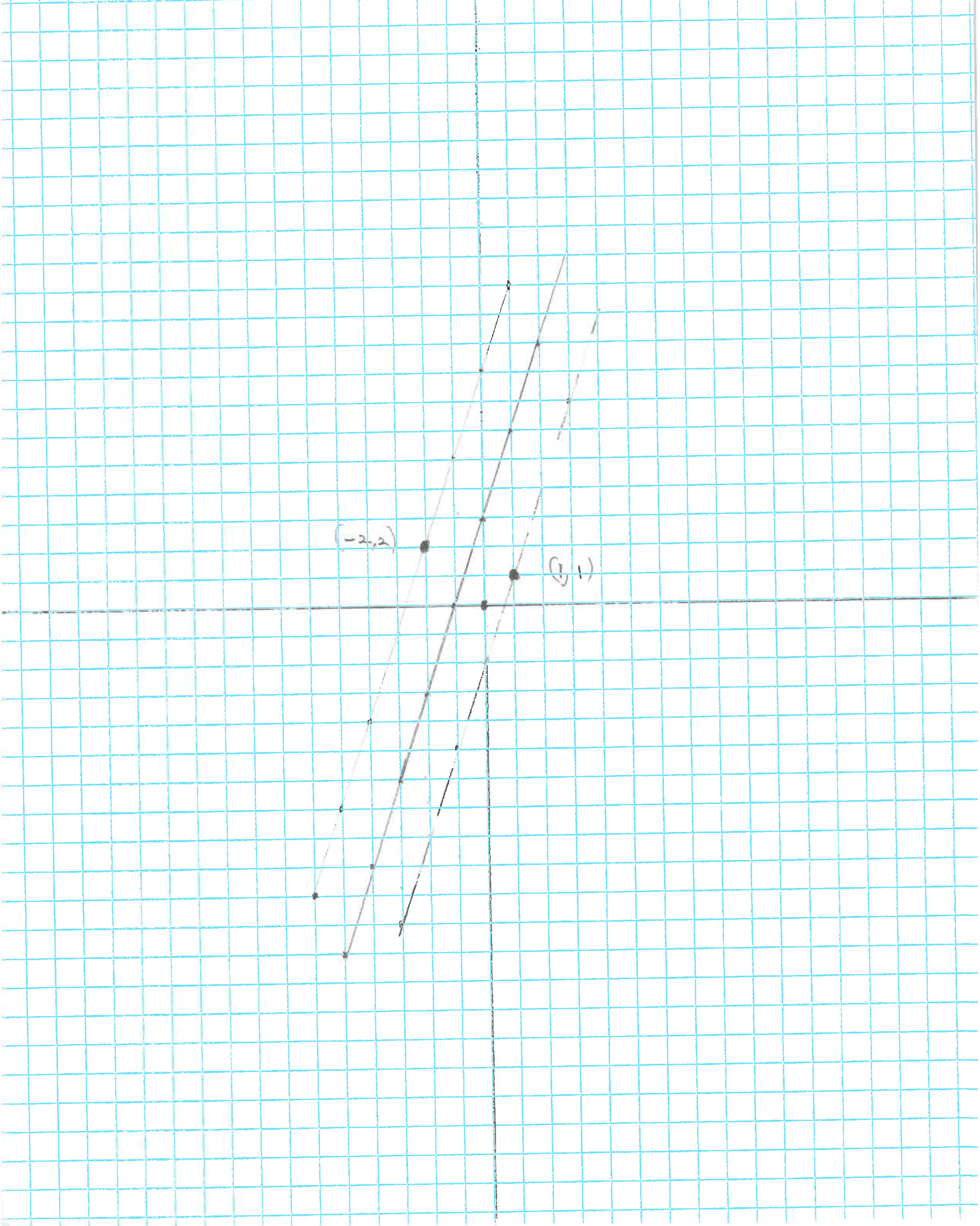
$$\begin{aligned} 1 - 12\lambda - \gamma &= 0 \\ 1 - 4\lambda + \gamma &= 0 \end{aligned} \tag{10}$$

Solving above we get: $\lambda = 1/9,\ \gamma = -1/3 = b$

$$\begin{aligned} \bar{w} &= \lambda_1 \bar{x}_1 - \lambda_2 \bar{x}_2 \\ \bar{w} &= 1/9(2,-2) - 1/9(-1,1) = \left(\frac{1}{3}, \frac{-1}{3}\right) \end{aligned} \tag{11}$$

we can confirm the value of b

$$\begin{aligned} b &= 1 - < \left(\frac{1}{3}, \frac{-1}{3}\right), (2,-2) >= 1 - \frac{4}{3} = -1/3 = \gamma \\ b &= -1 - < \left(\frac{1}{3}, \frac{-1}{3}\right), (-1,1) >= -1 - \frac{-2}{3} = -1/3 = \gamma \end{aligned} \tag{12}$$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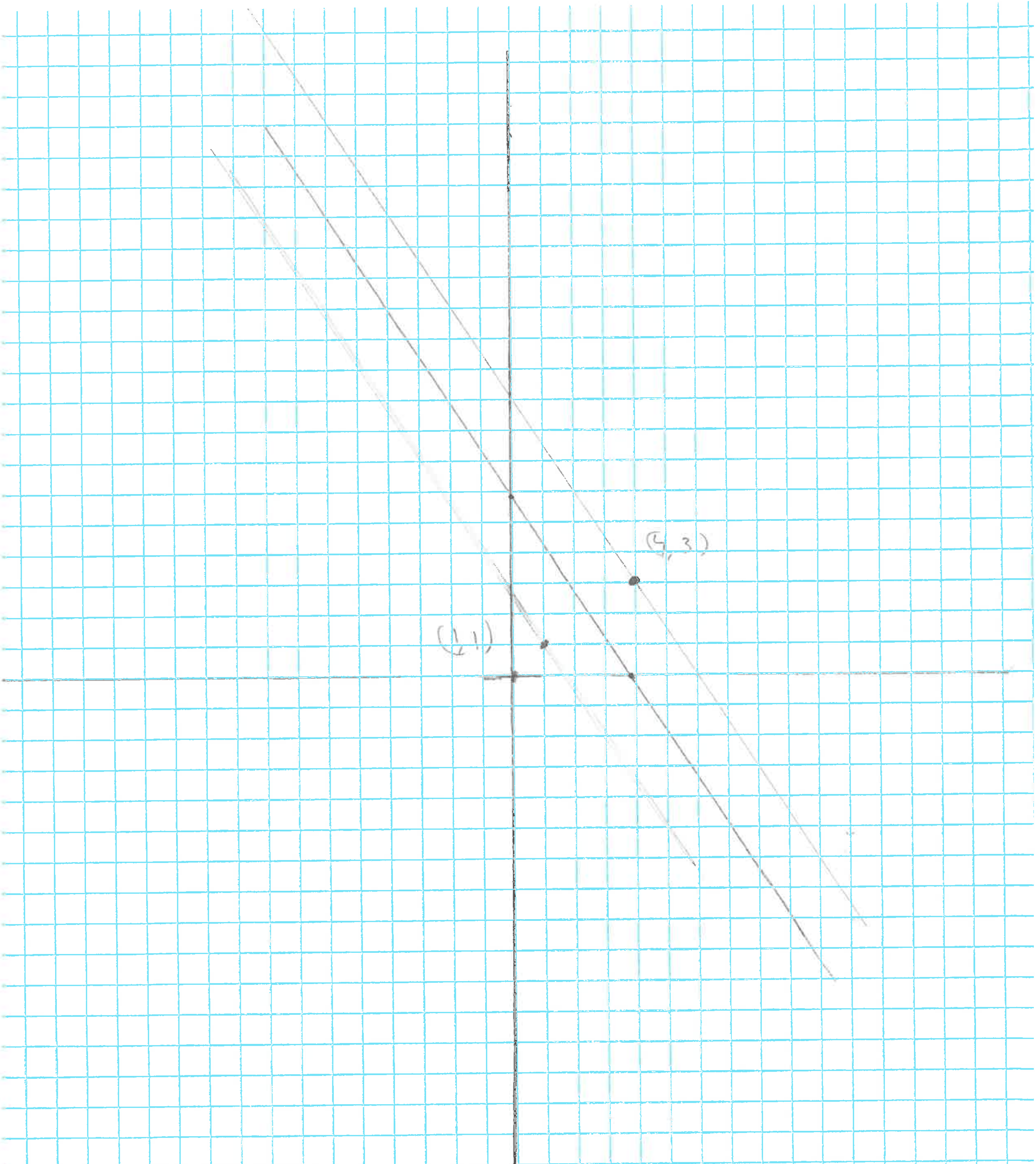
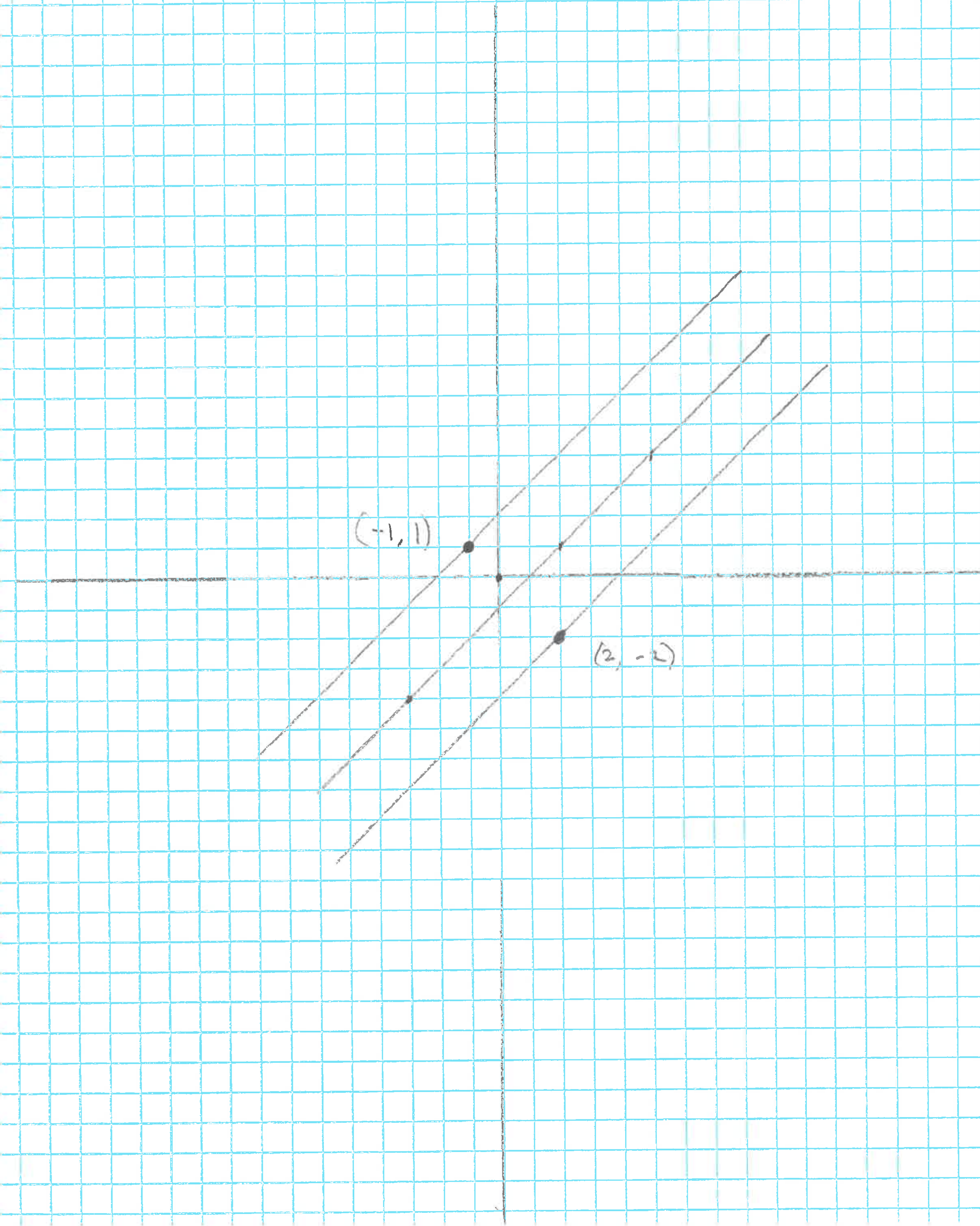


(4, 3)
(1, 1)


(-1, 1)
(2, -2)