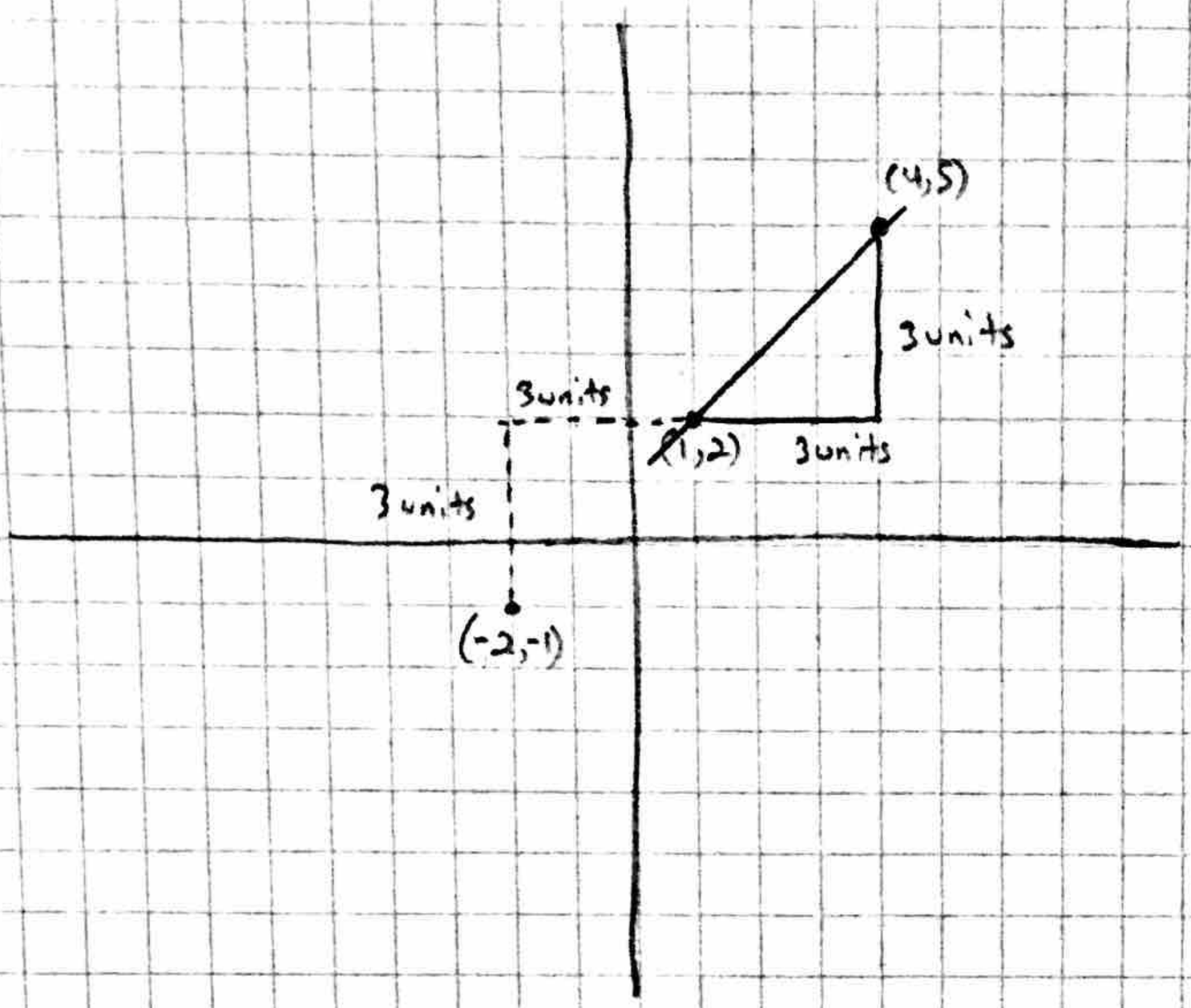
The midpoint of a line segment is (1,2). If one of the endpoints is (4,5), find the other endpoint.

Graphical Approach




Algebraic Approach

① $MP = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

↓

② $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) = (\overset{x}{1}, \overset{y}{2})$

↓

③ $\left(\frac{4 + x_2}{2}, \frac{5 + y_2}{2}\right) = (1,2)$

↓

Solve for $x_2$

$\frac{4 + x_2}{2} = 1$

Solve for $y_2$

$\frac{5 + y_2}{2} = 2$

↓

④ $2\left(\frac{4 + x_2}{2}\right) = 1(2)$

↓

$4 + x_2 = 2$

$-4 \quad -4$

$x_2 = -2$

⑤ $2\left(\frac{5 + y_2}{2}\right) = (2)2$

$5 + y_2 = 4$

$-5 \quad -5$

$y_2 = -1$

→ Other endpoint is $(-2, -1)$