Parallel Lines

Same slope, different y-intercept

$y = 4x + 7$

$y = 4x + 5$

Same line

multiple of original line

$y = 3x + 5$

$2y = 6x + 10$

Perpendicular lines

Slopes are negative reciprocals

Product of slopes is -1

$y = 2x - 3$ $\qquad$ $y = -\frac{2}{3}x - 7$

$y = -\frac{1}{2}x + 1$ $\qquad$ $y = \frac{3}{2}x + 5$

Write an equation of a line parallel to $y = 3x - 4$ passing through $(-2, 7)$

$m = 3$ $(-2, 7)$

Slope Intercept

$y = mx + b$

$7 = 3(-2) + b$

$7 = -6 + b$

$+6 \quad +6$

$13 = b$

$y = 3x + 13$

Point Slope Form

$y - y_1 = m(x - x_1)$

$y - 7 = 3(x + 2)$

$y - 7 = 3x + 6$

$+7 \quad +7$

$y = 3x + 13$

Standard Form $Ax + By = C$

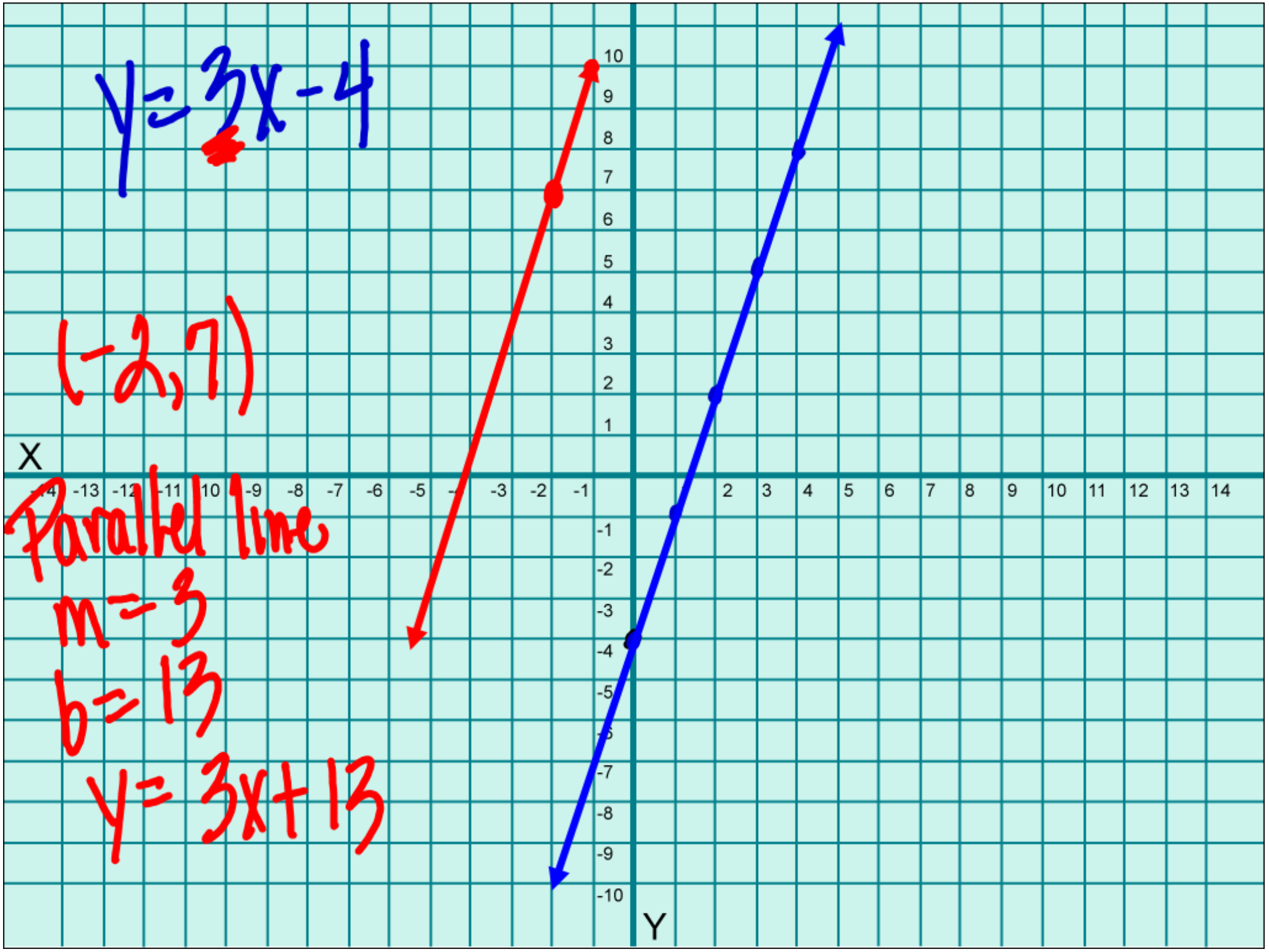
$y = 3x + 13$

$-3x \quad -3x$

$-3x + y = 13$

$\cdot -1 \quad \cdot -1 \quad \cdot -1$

$3x - y = -13$


y=3x-4
(-2,7)
X
Y
Parallel line
m=3
b=13
y=3x+13

Parallel to $y = -2x - 4$

contains $(2, 5)$

Same Slope

$m = -2$

$y = mx + b$

$5 = -2(2) + b$

$+4 \quad +4$

$5 = -4 + b$

$9 = b$

$y = -2x + 9$

$y - y_1 = m(x - x_1)$

$m = -2$

$(2, 5)$

$y - 5 = -2(x - 2)$

$+5 \quad +5$

$y - 5 = -2x + 4$

$y = -2x + 9$

Write an equation of a line perpendicular to $5x + 2y = 10$ containing the point $(3, -5)$

$5x + 2y = 10$

$Ax + By = C$ slope $\frac{-A}{B}$

$m = \frac{-5}{2}$

Slope Int. Form

$5x + 2y = 10$ $-5x$ $-5x$

$2y = -5x + 10$

$\frac{2y}{2} = \frac{-5x}{2} + \frac{10}{2}$

$y = -\frac{5}{2}x + 5$

$m = -\frac{5}{2}$

Perpendicular line $m = \frac{2}{5}$ opposite sign reciprocal

$(3, -5)$

$y = mx + b$

$-5 = \frac{2}{5} \cdot \frac{3}{1} + b$

$-5 = \frac{6}{5} + b$

$-\frac{6}{5}$ $-\frac{6}{5}$

$-\frac{31}{5} = b$

$y = \frac{2}{5}x - \frac{31}{5}$

$-\frac{5}{1} = -\frac{25}{5}$

$-\frac{6}{5}$

$-5 - 1\frac{1}{5}$

$-6\frac{1}{5}$

⊥ to $y = 2x - 5$

$m = 2$

contains $(-1, 4)$

⊥ line $m = -\frac{1}{2}$

$y = mx + b$

$4 = -\frac{1}{2}(-1) + b$

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

$-\frac{1}{2} \quad -\frac{1}{2}$

$3\frac{1}{2} = b$

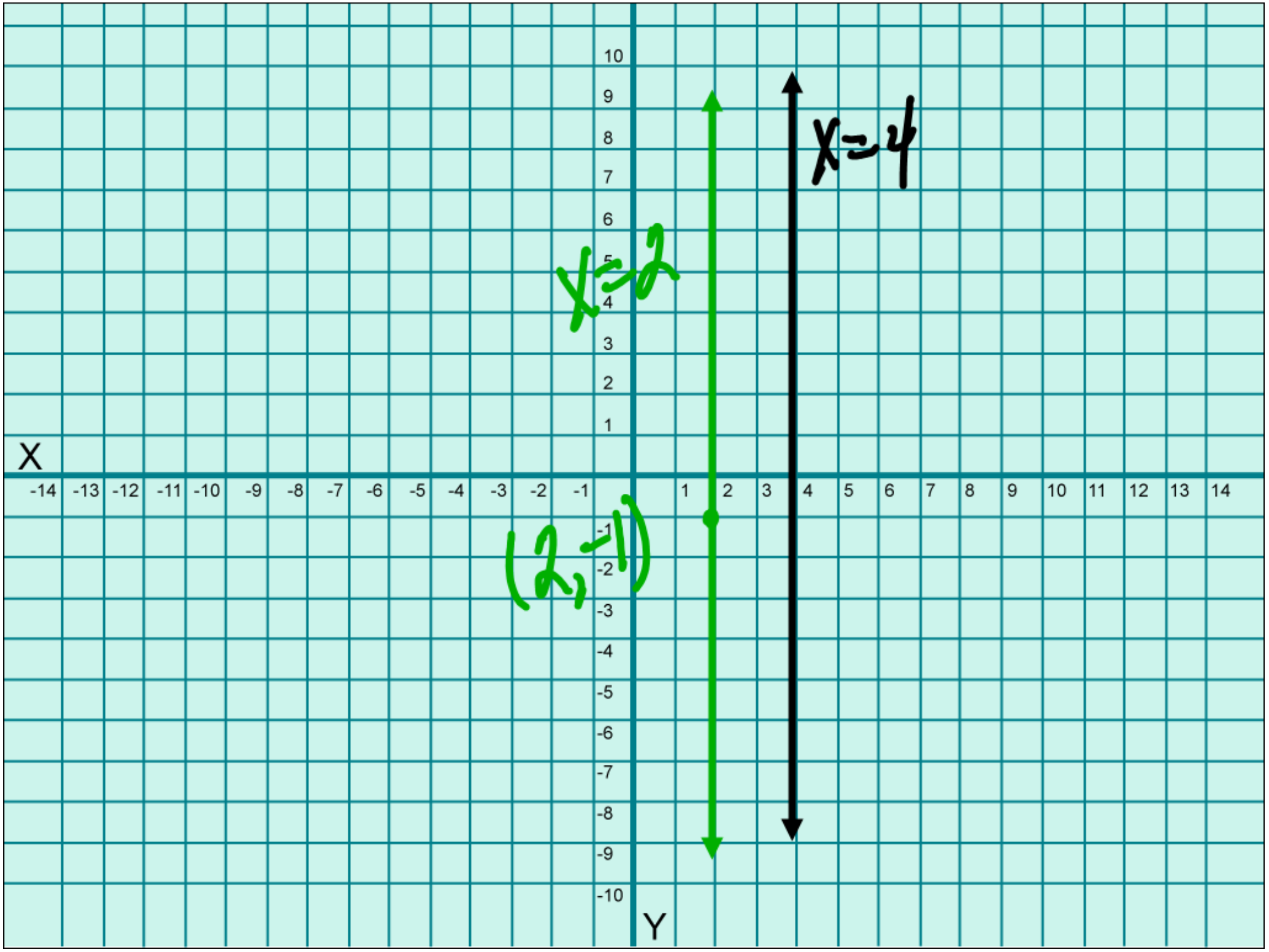
$y = -\frac{1}{2}x + 3\frac{1}{2}$

Parallel to

$x = 4$

$(2, -1)$

$x = 2$


X
Y
x=4
x=2
(2,-1)

⊥ to

$x = 4$

Vertical line

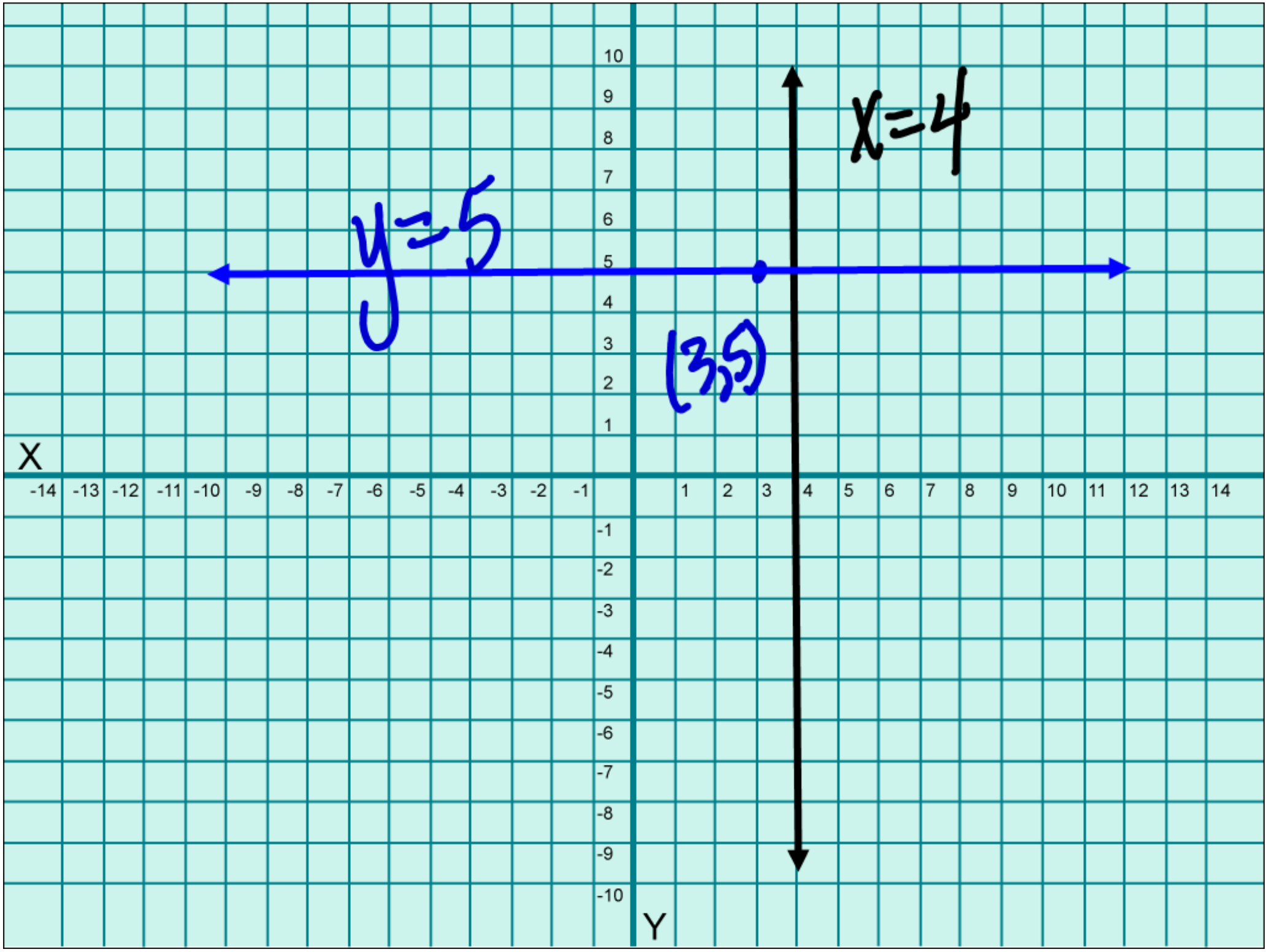
Contains

$(3, 5)$

⊥ line

Horizontal line

$y = 5$


y=5
x=4
(3,5)
X
Y
-14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1
1 2 3 4 5 6 7 8 9 10 11 12 13 14
10 9 8 7 6 5 4 3 2 1
-1 -2 -3 -4 -5 -6 -7 -8 -9 -10

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