

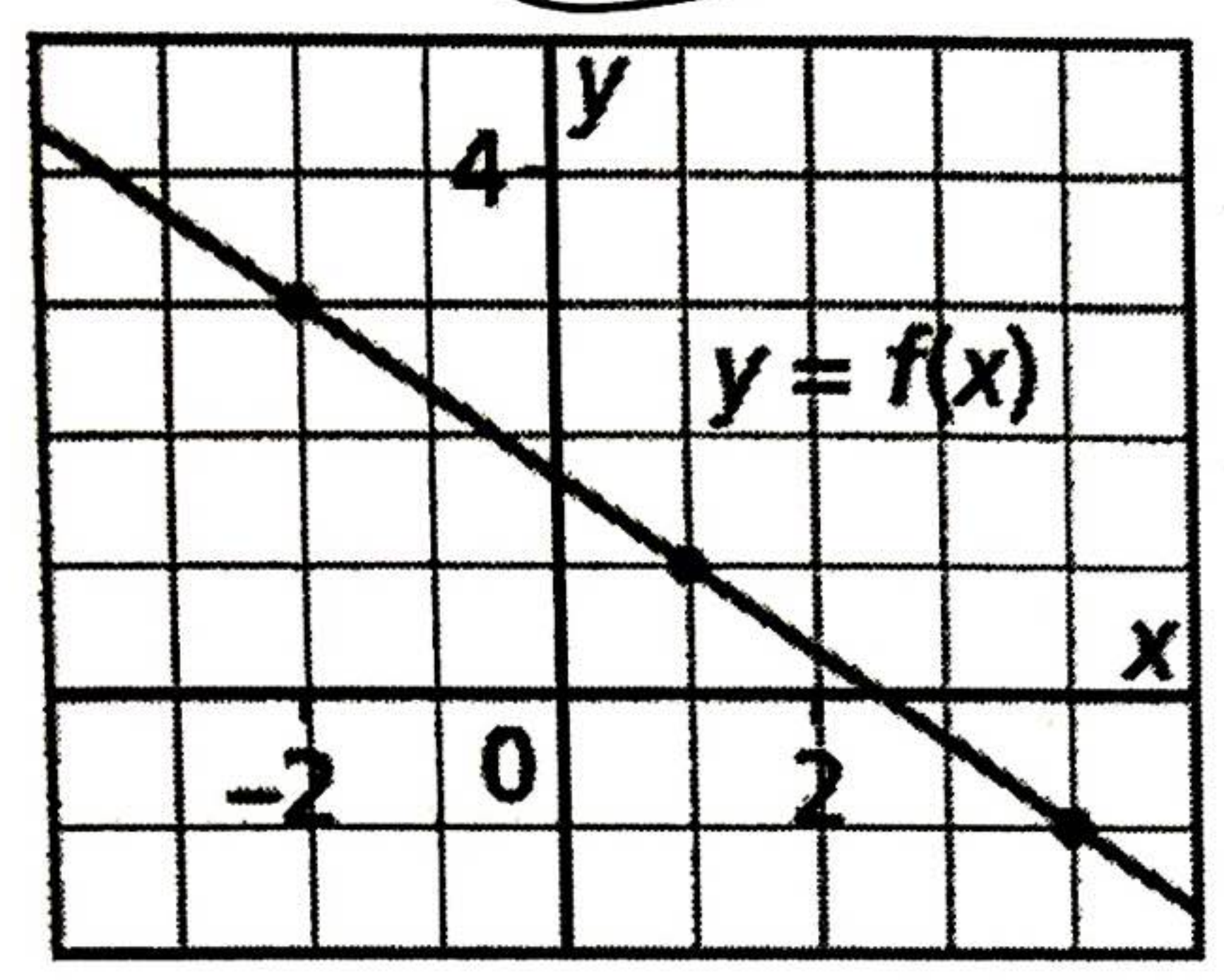
Name: _____ Date: _____

Linear Relations Review Package

1. What is the slope of each line below? Is it a positive or negative slope?

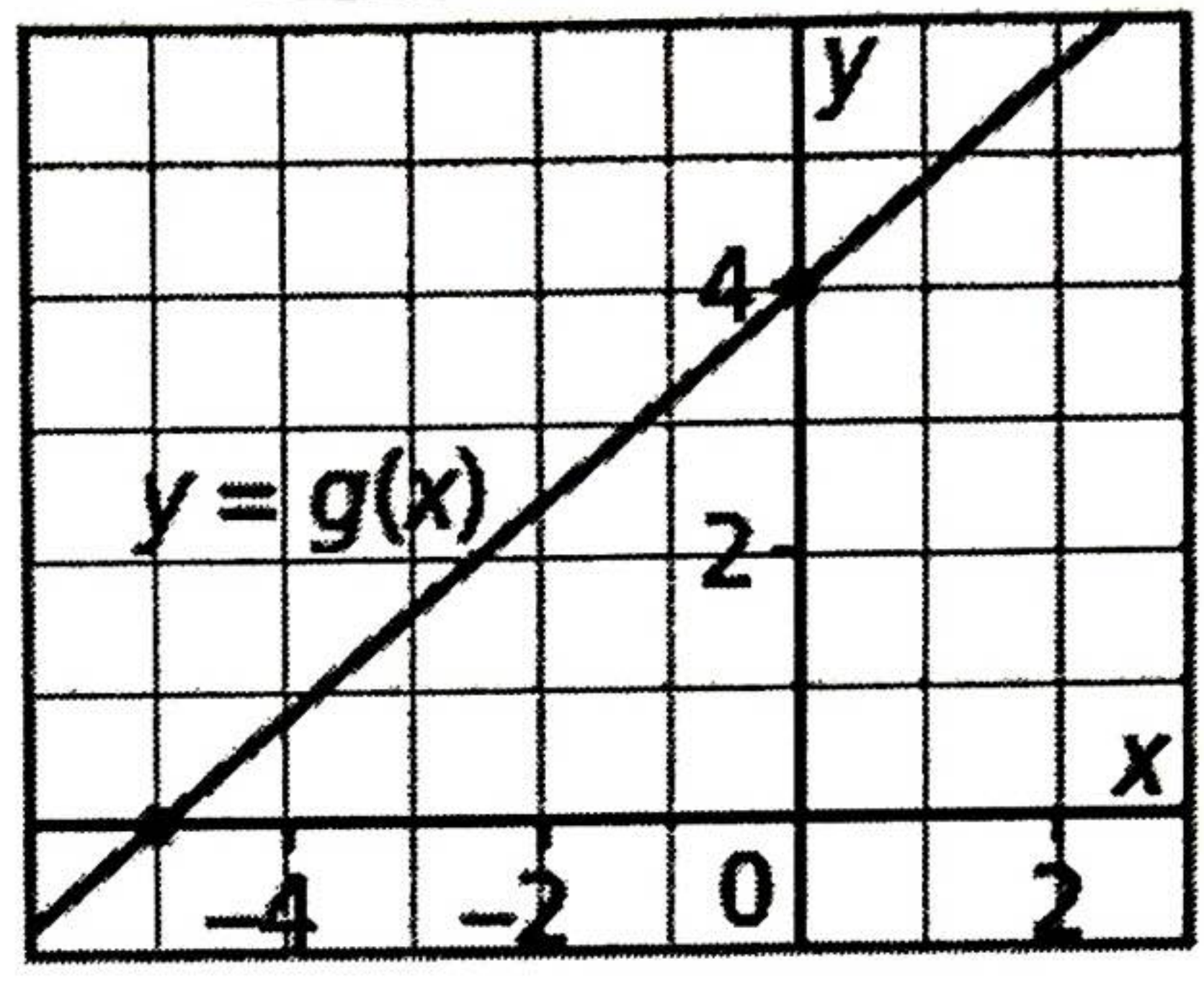
a) Slope:

Positive Negative



b) Slope:

Positive Negative



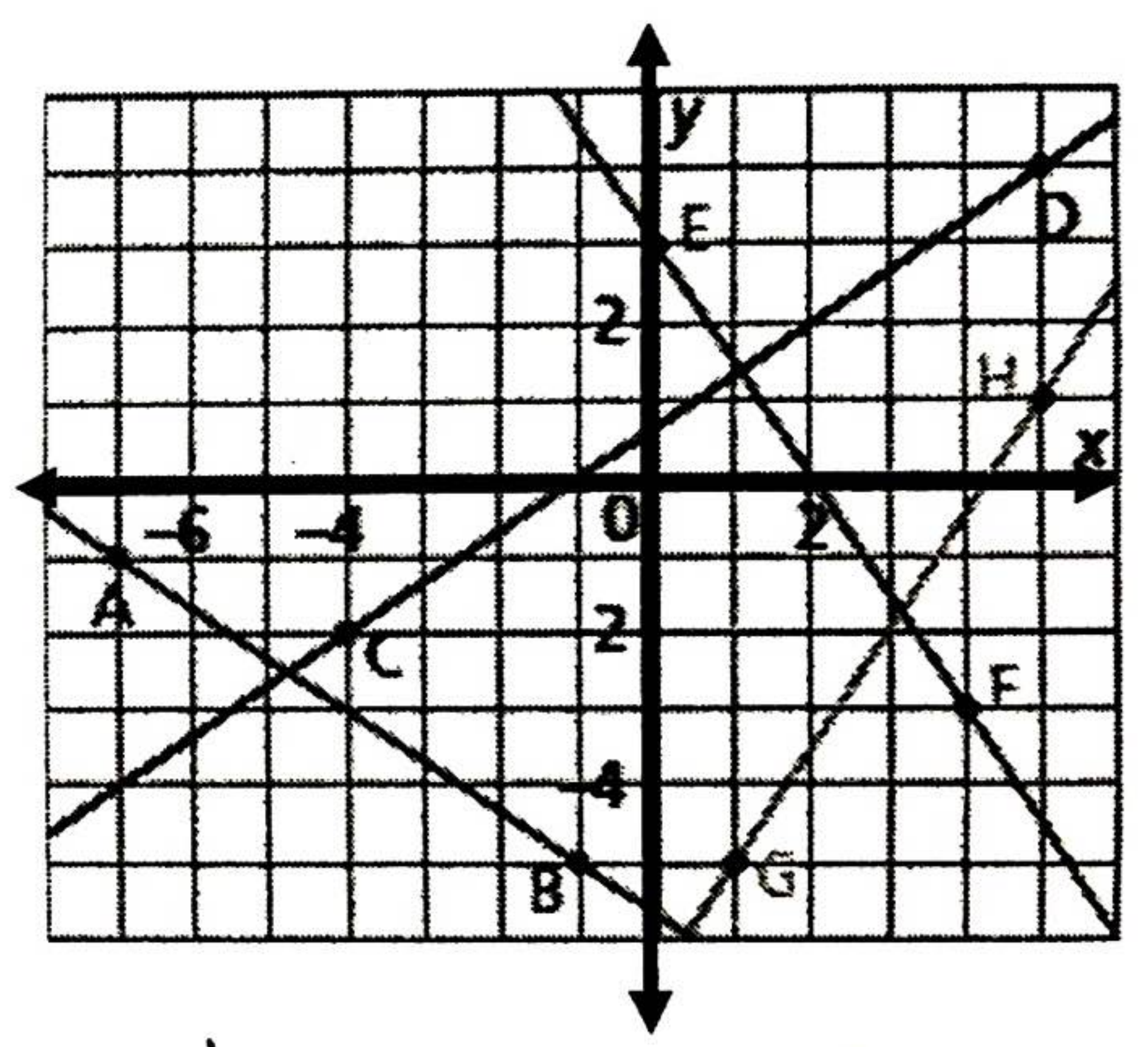
2. For the next two questions, choose the correct answer: A, B, C, or D

Which line at the right has slope $-\frac{3}{2}$?

- A. AB B. CD C. EF D. GH

Which line at the right has equation $2x - 3y + 2 = 0$?

- A. AB B. CD C. EF D. GH
- x -intercept
 $2x + 2 = 0$
 $2x = -2$
 $x = -1$



3. The x-intercept of the graph of $5x - 3y - 15 = 0$ is 3 $(3, 0)$

$y = 0$ $5x - 15 = 0$
 $5x = 15$
 $x = 3$

4. The slope of the graph of the relation $x = \frac{1}{5}y + 2$ is 5

$x = \frac{1}{5}y + 2$
 $-\frac{1}{5}y = -x + 2$
 $y = 5x - 10$

5. The y-intercept of the graph of the line $y - 3 = \frac{1}{2}(x + 10)$ is 8 $(0, 8)$

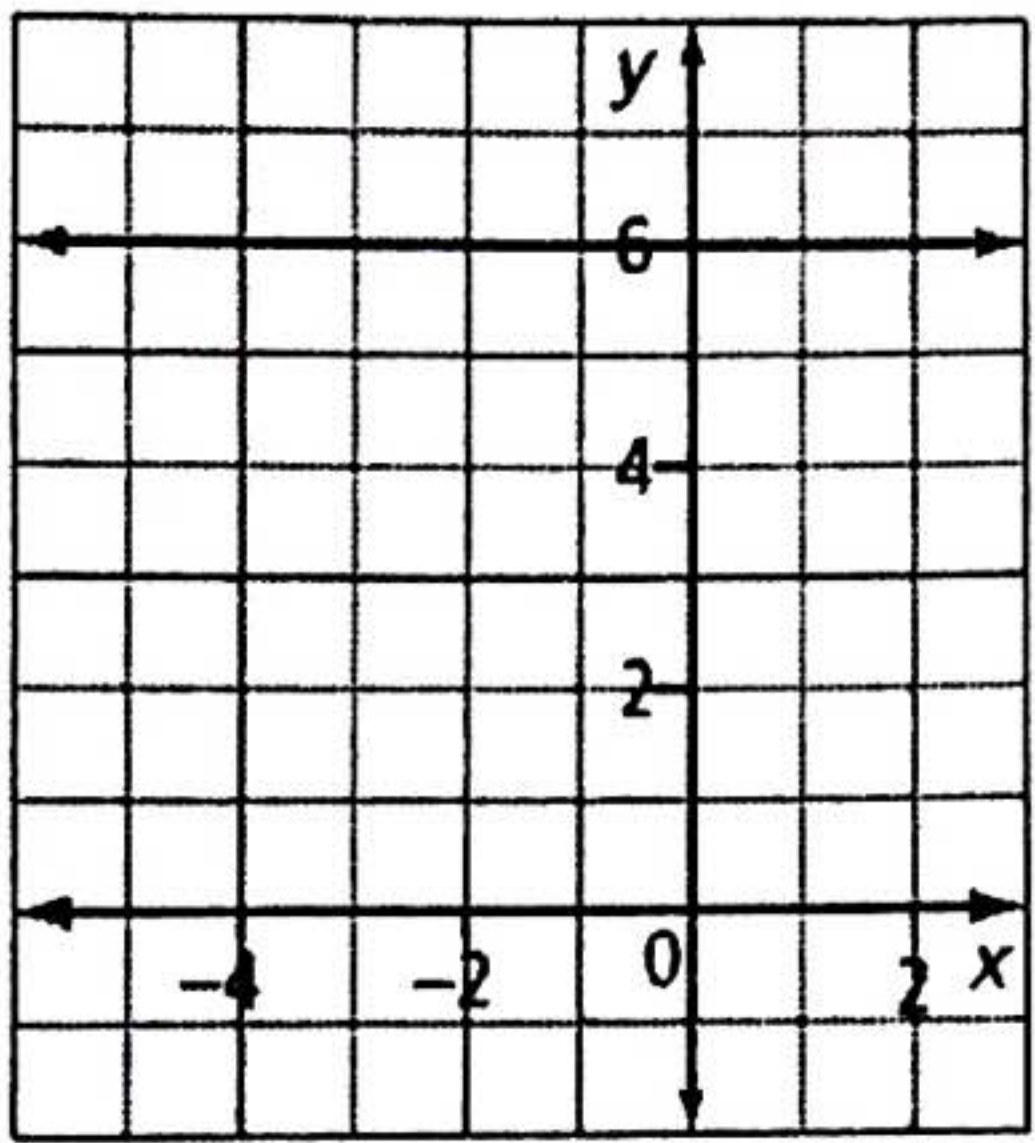
$x = 0$
 $y - 3 = \frac{1}{2}(10)$
 $y - 3 = 5$
 $y = 8$

$3n - 6 = n + 8$

2. Solve for the variable. Show all work
a) $7x - 2 = 11$

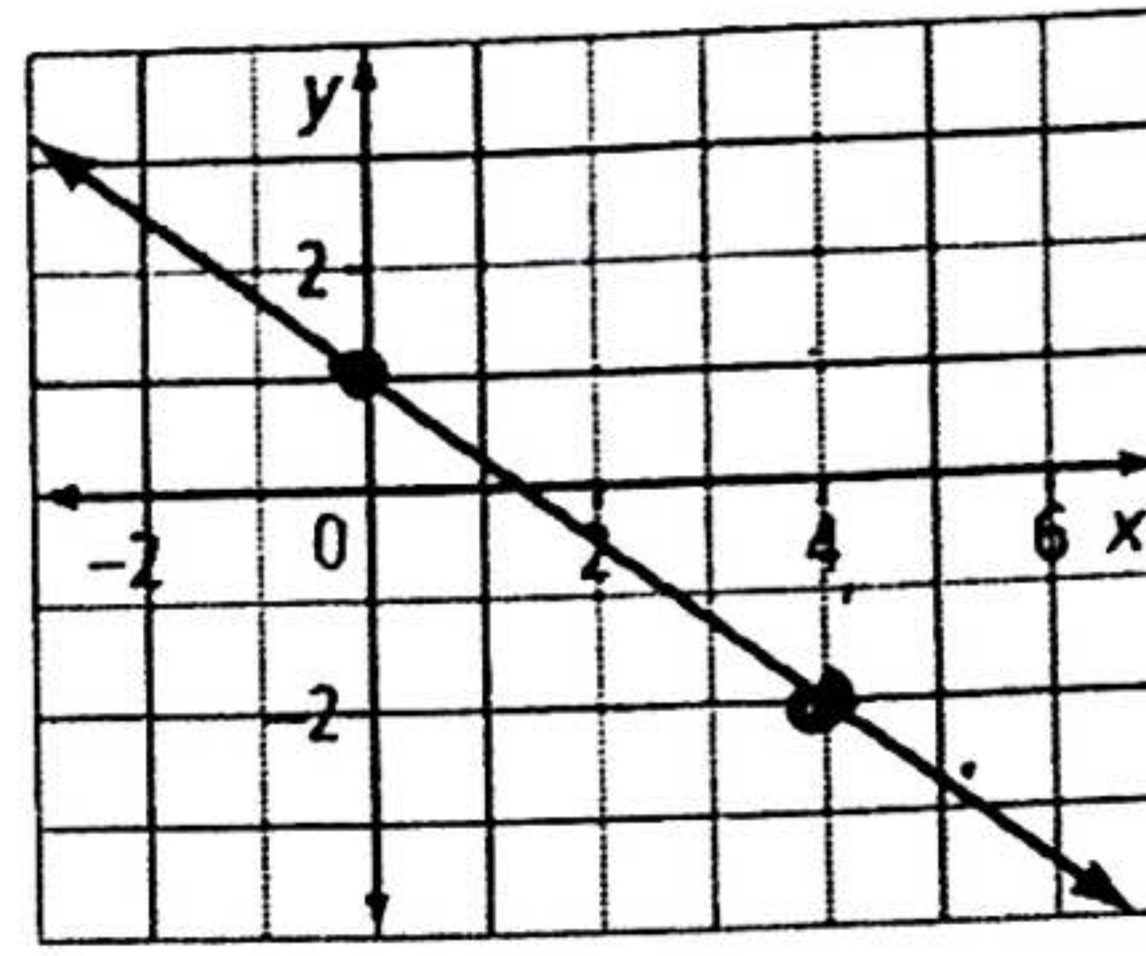
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6. Write out the equation of each line below in slope-intercept form.



a)

$y = 6$



b)

$y = -\frac{3}{4}x + 1$

7. Match each of the equations below with its graph. Justify each choice

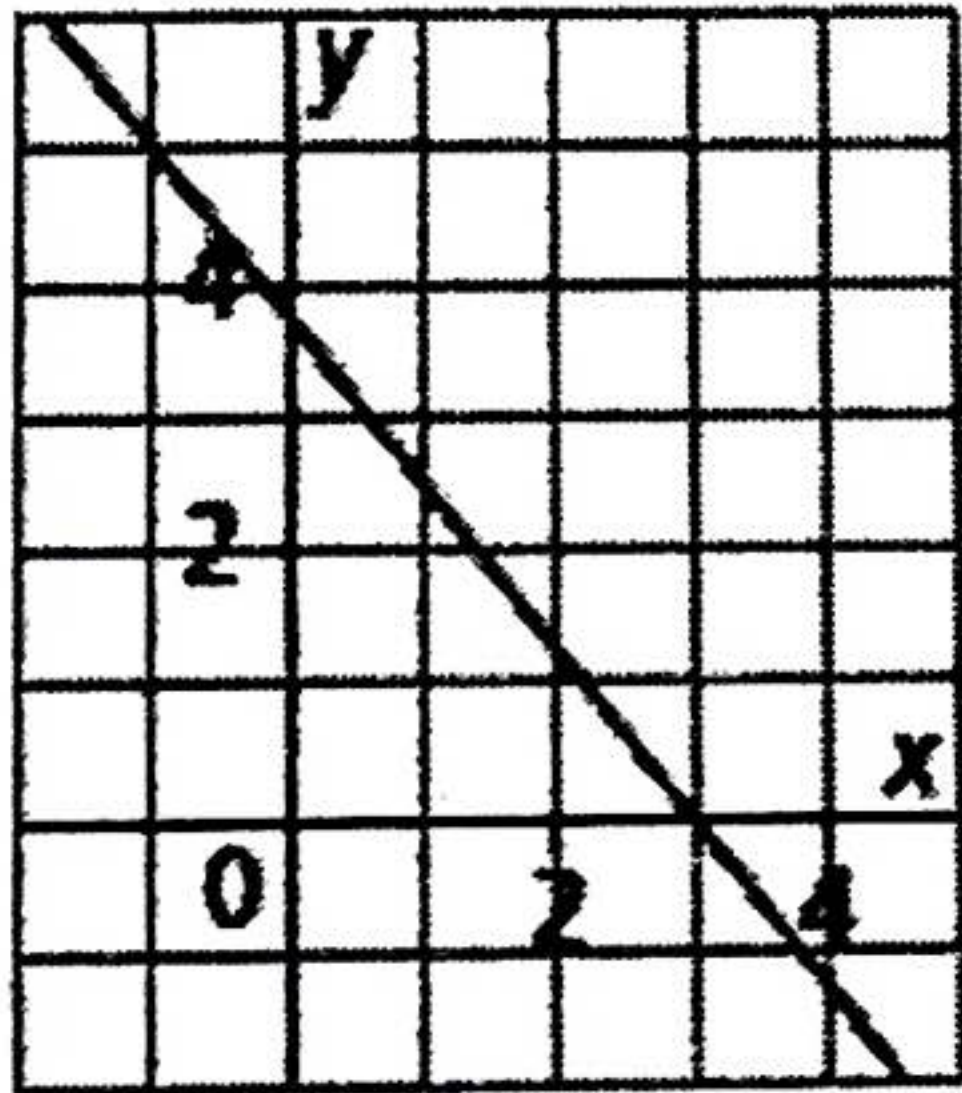
a) $y = -\frac{4}{5}x + 3$

b) $y - 3 = -\frac{4}{5}(x + 3)$

c) $5x + 4y - 15 = 0$

y intercept
 ≈ 3.8
slope
 $-\frac{5}{4}$
x intercept
 $(3, 0)$

Graph A



Equation:

Ⓒ $5x + 4y - 15 = 0$

Justification

$5x + 4y = 15$
x-intercept
 $5x = 15$

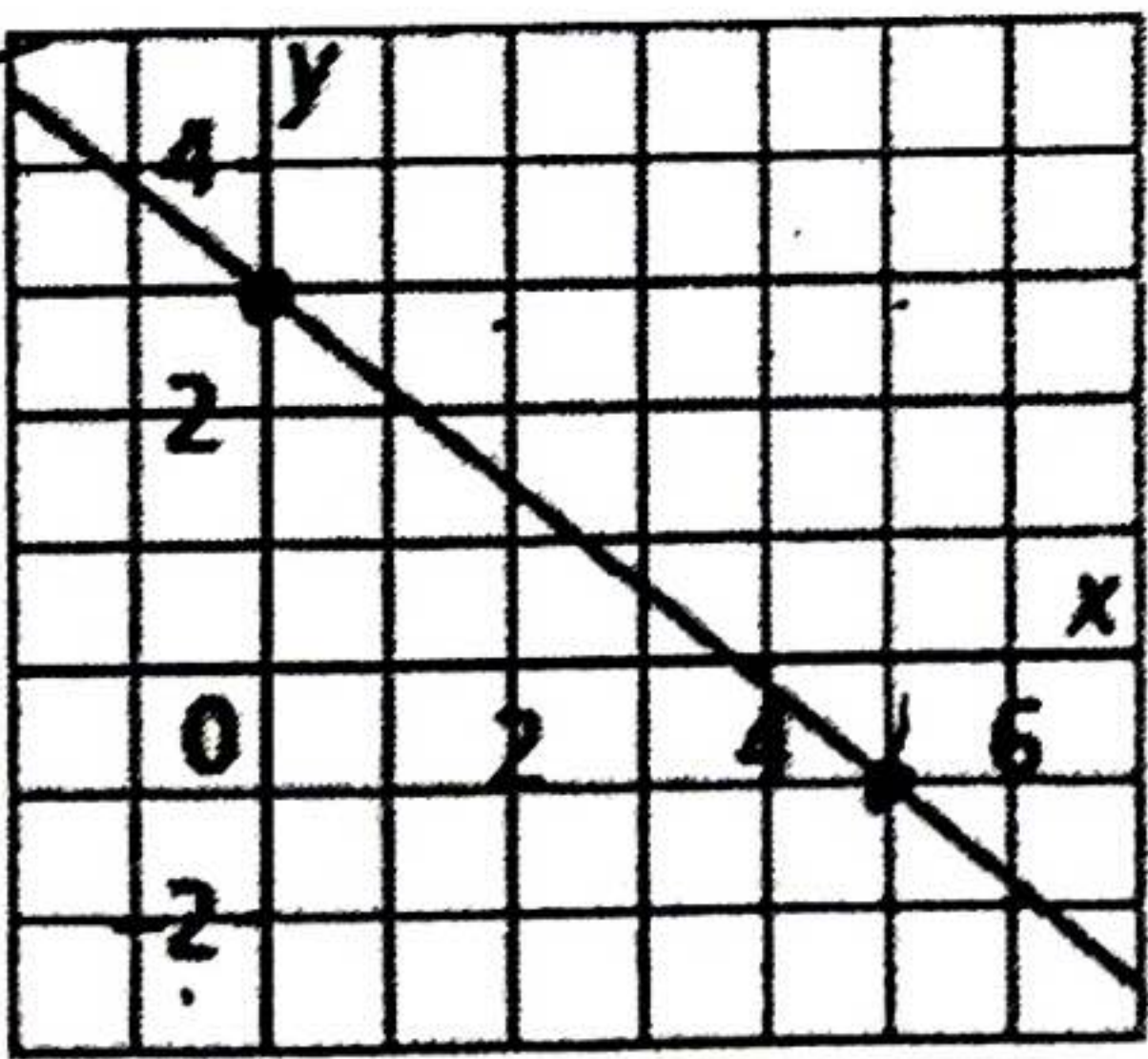
$x = 3$
 $(3, 0)$

slope

$5x + 4y - 15 = 0$
 $4y = -5x + 15$
 $\frac{4y}{4} = \frac{-5x + 15}{4}$

$y = \left(-\frac{5}{4}x + \frac{15}{4}\right)$
slope.

Graph B



y intercept
 $(0, 3)$
x-intercept
 $\approx (3.8, 0)$
slope
 $-\frac{4}{5}$

Equation:

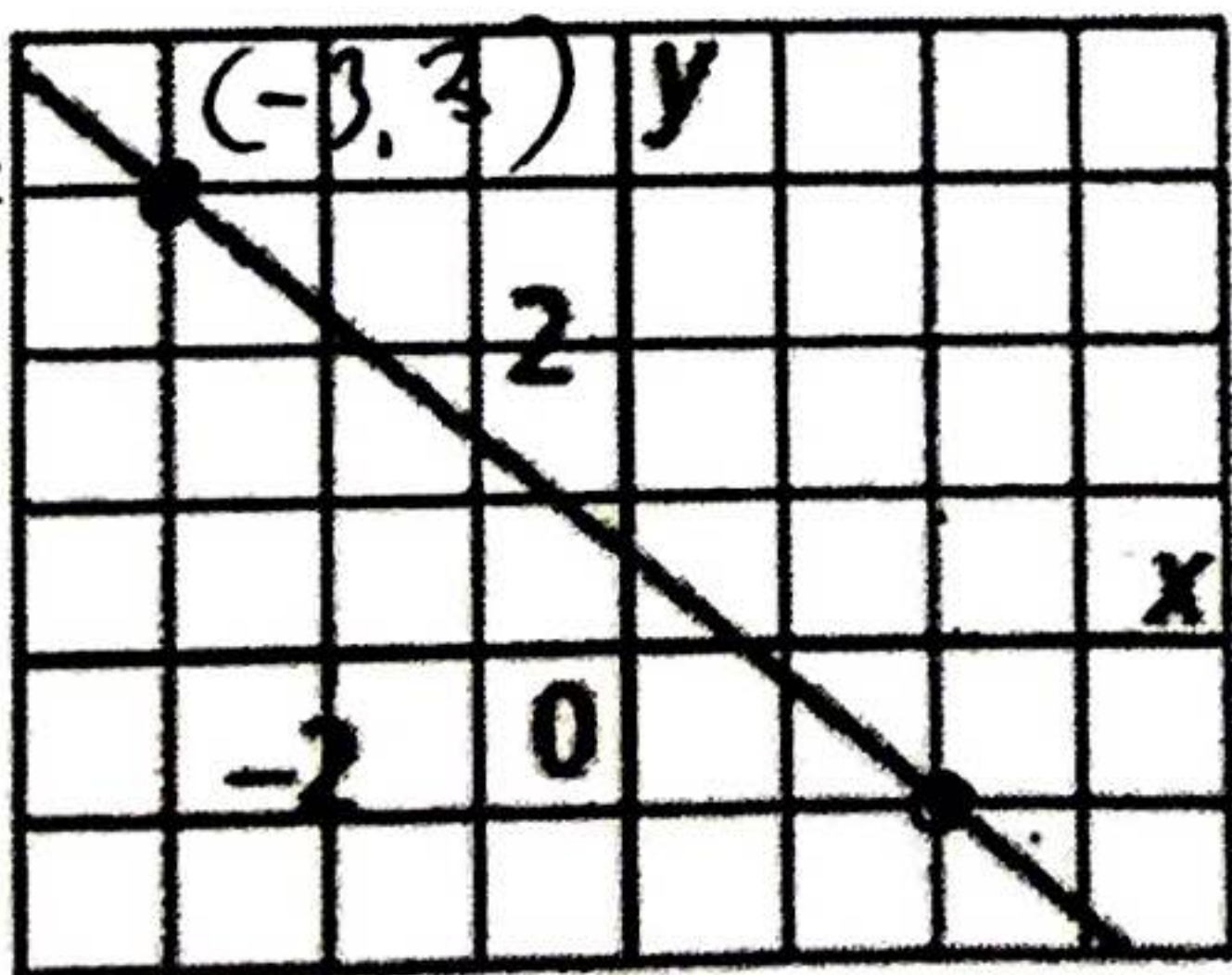
Ⓐ $y = -\frac{4}{5}x + 3$

Justification

$-\frac{4}{5}$ is the slope

y intercept is 3 $\rightarrow (0, 3)$

Graph C



y intercept

Equation:

Ⓑ $y - 3 = -\frac{4}{5}(x + 3)$

Justification

has a point $(-3, 3)$

slope = $-\frac{4}{5}$

8. Identify the slope of a line parallel to each given line.

a) $y = \frac{11}{3}x + 9$ $\boxed{\frac{11}{3}}$

b) $4x + 6y = 20$ $\boxed{-\frac{2}{3}}$

$\frac{6y}{6} = \frac{-4x+20}{6}$ $-y = -\frac{2}{3}x + \frac{10}{3}$ ← simplify!

9. Identify the slope of a line perpendicular to each given line.

a) $y = 2x - 4$ $\boxed{-\frac{1}{2}}$

b) $3x + 5y = 35$ $\boxed{\frac{5}{3}}$

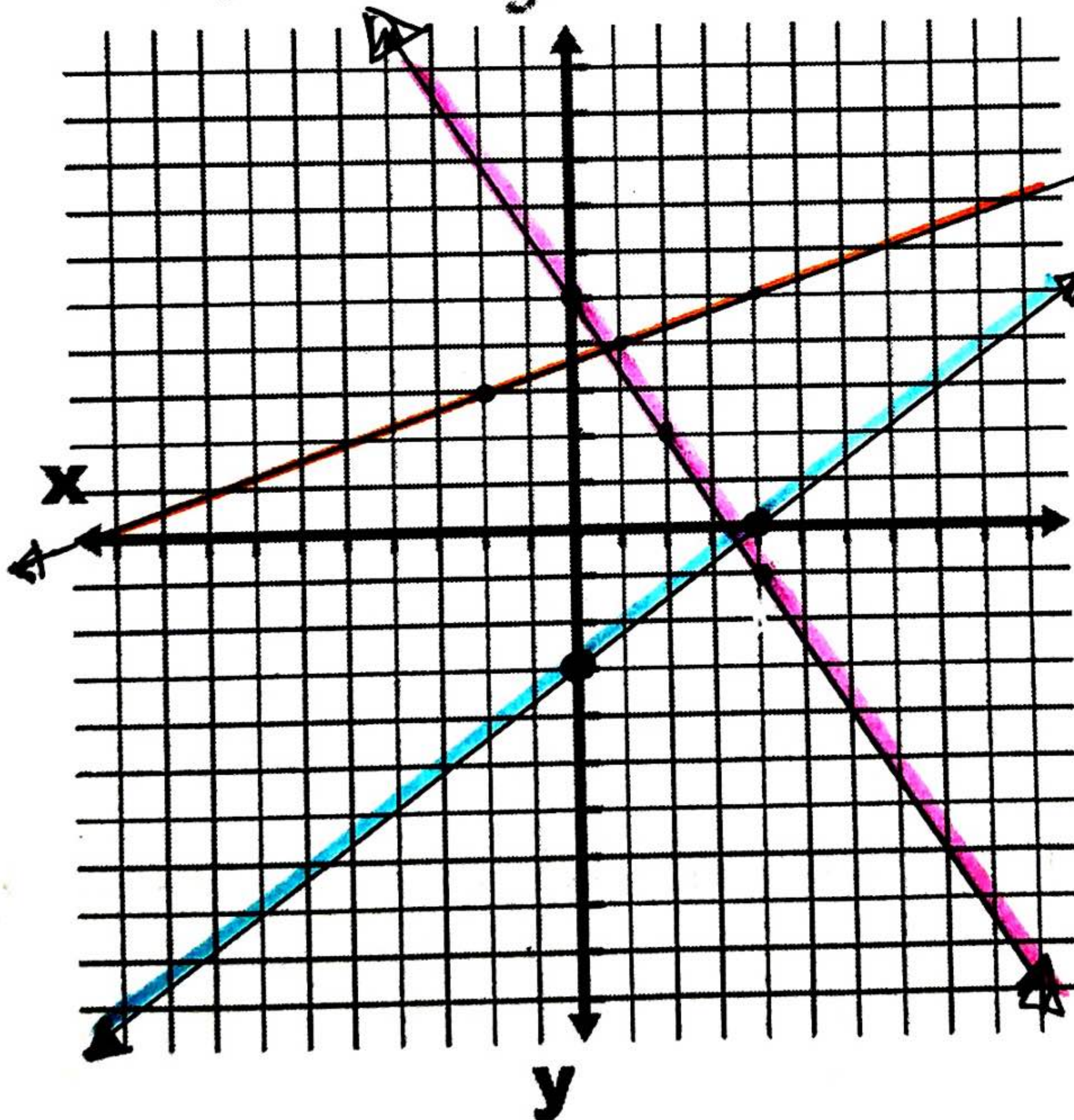
$\frac{5y}{5} = \frac{-3x+35}{5}$ → $y = -\frac{3}{5}x + 7$

10. a) Graph each line below. Make sure you label each line.

i) $y = -\frac{3}{2}x + 5$

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

iii) $3x - 4y - 12 = 0$



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

iii) $3x - 4y - 12 = 0$

i) $y = \frac{3}{2}x + 5$

$3x - 4y - 12 = 0$

y intercept

$-4y - 12 = 0$

$4y = 12$

$y = 3$

x intercept

$3x = 12$

$x = 4$

b) Determine the equation of the line that is parallel to the line with the equation $y = 3x + 5$, and passes through $A(6,2)$. Explain how you know your equation is correct.

parallel - same slope

$3(x - 6) = y - 2$

← equation in slope-point form of a line that has a slope of 3 and passes through $(6, 2)$

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- c) Determine an equation of the line that is perpendicular to the line with equation $y - 3 = \frac{1}{3}(x + 2)$ and passes through B(-1, 2). Write the new equation in general form.

new perpendicular slope
-3

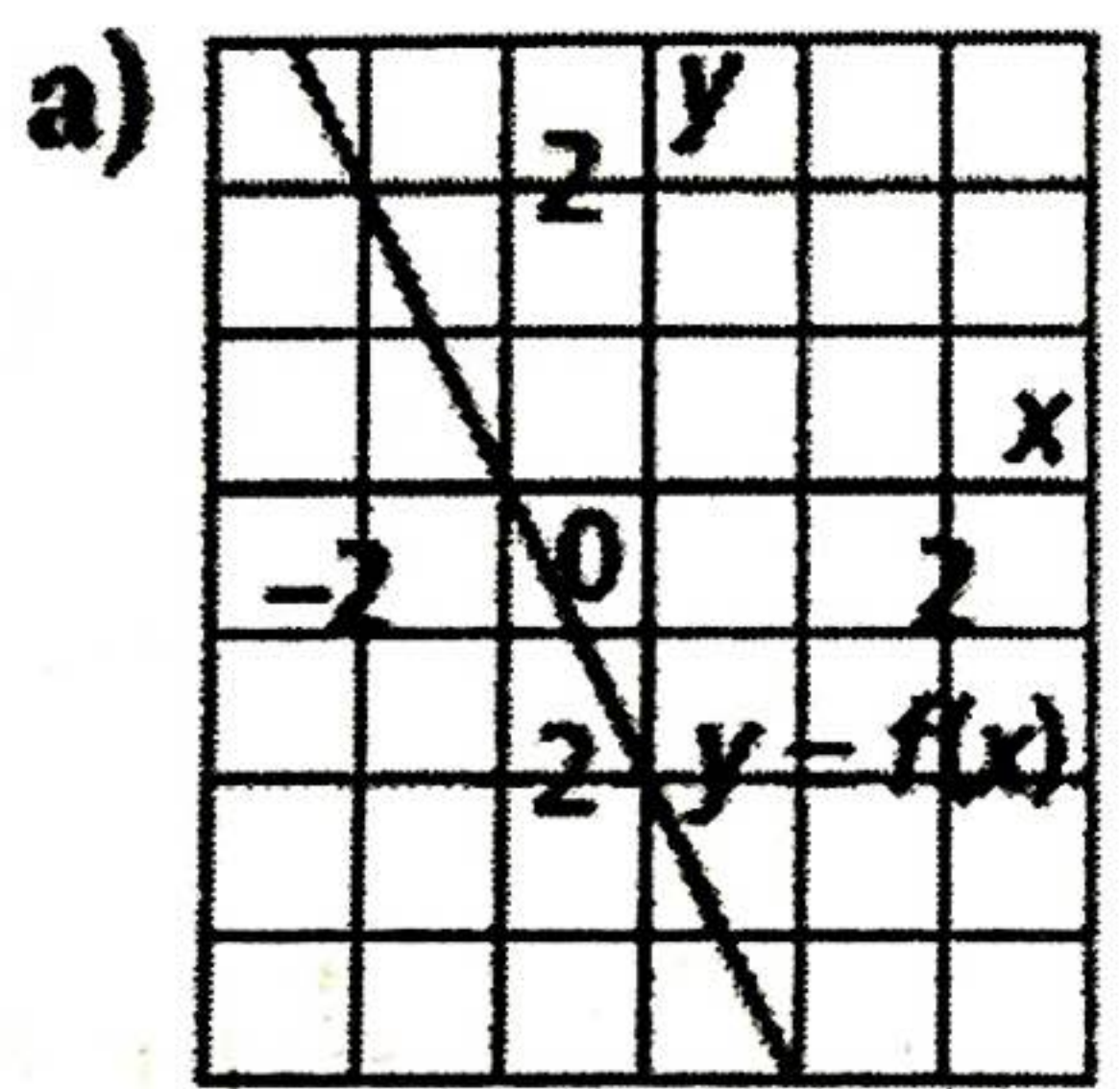
General form

equation in slope point form →

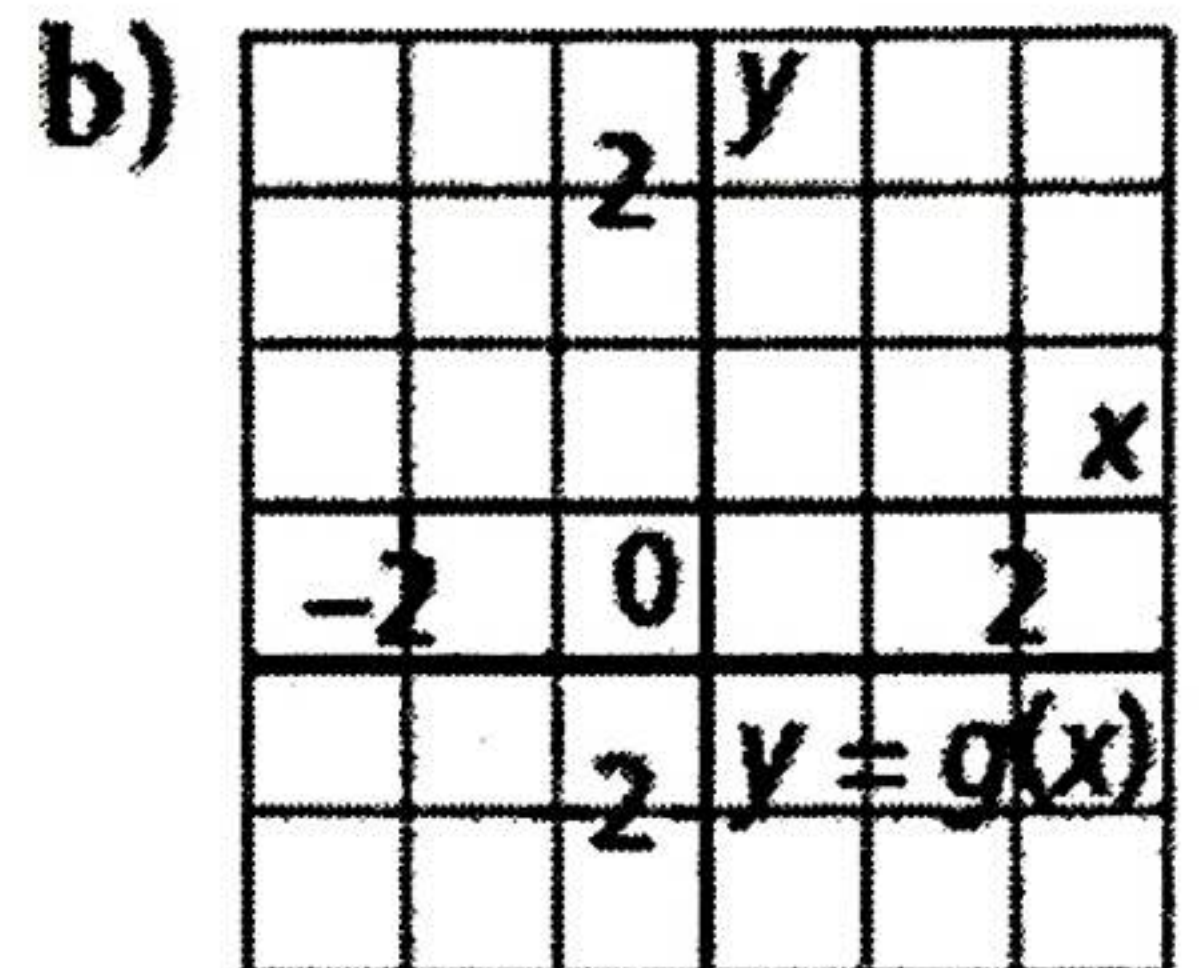
$$-3(x+1) = y - 2$$

$$\begin{aligned} -3x - 3 &= y - 2 \\ -y - y & \\ -3x - y - 3 &= -2 \\ +2 &+2 \\ (-3x - y - 1 &= 0) (-1) \\ \boxed{3x + y + 1 = 0} \end{aligned}$$

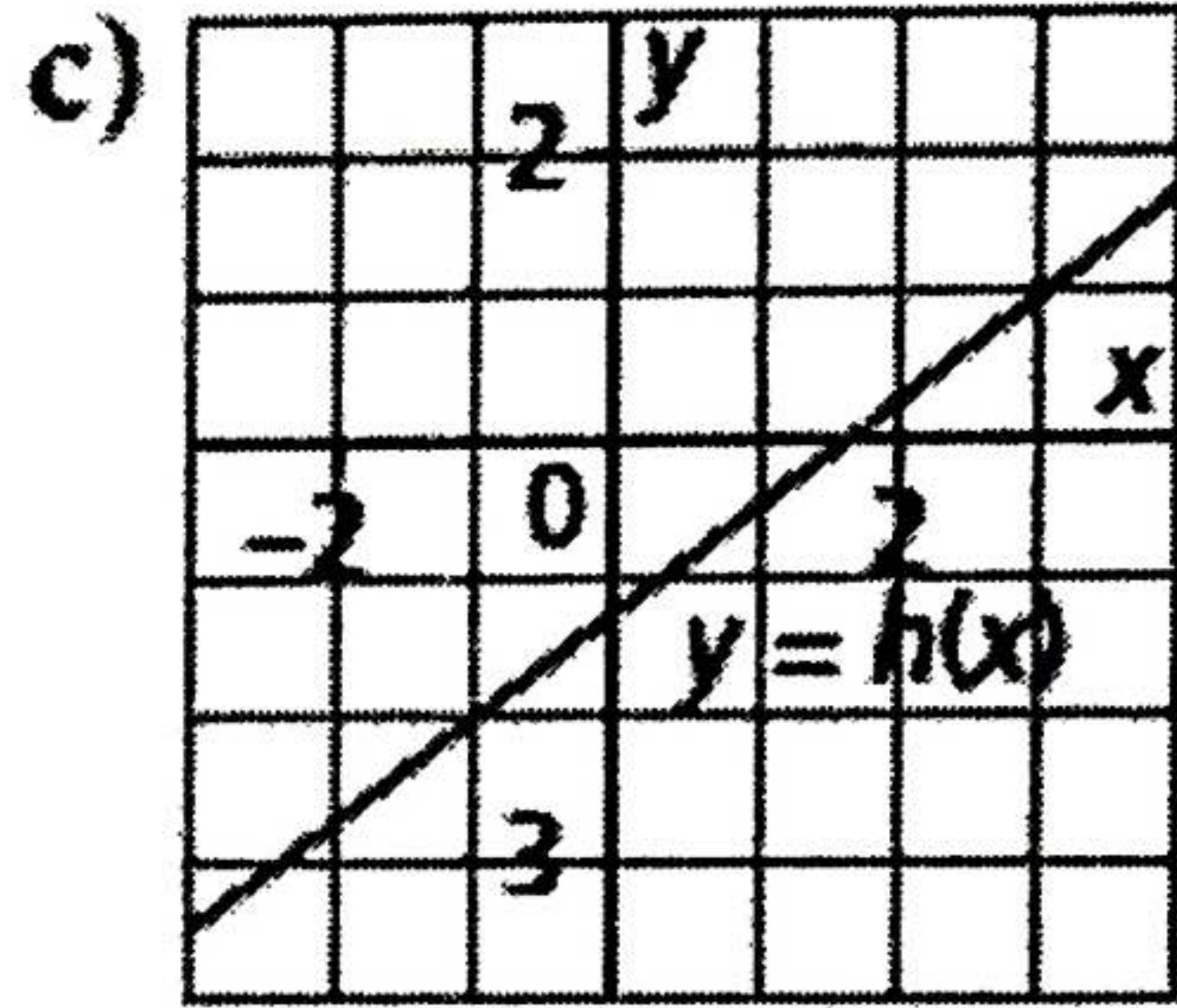
11. Write the equation of each line in the form that you think best describes the line



$$\boxed{y = -2x - 2}$$



$$\boxed{y = -1}$$



$$\boxed{y - 1 = \frac{3}{4}(x - 3)}$$

Extended Response

- 12. A hot-air balloon is rising at a constant rate of 0.75 m/s. The equation that represents the height of the balloon, h , in metres, as a function of time, t , in seconds, is $h = 0.75t + 3$.

- a) What does the h -intercept of the graph of the relation represent?

The height of the balloon when 0 seconds have passed

- b) How high will the balloon be after 20 s?

$$\begin{aligned} h &= 0.75 \times 20 + 3 \\ &= 15 + 3 \\ &= 18\text{m} \end{aligned}$$

- c) How long will it take the balloon to reach a height of 15 m?

$$\begin{aligned} 15 &= 0.75t + 3 \\ 0.75t &= 12 \\ t &= 16 \end{aligned}$$

should take less than 20 seconds (judging from above question).

It will take 16 seconds.