U1 L3 Linear Equations in Two Variables — Practice

Name: KEY HR: _____

Group A — Finding Slope from Two Points

Find the slope of the line through each pair of points. If the slope is undefined, say so.

1. (1, 2) and (4, 8)

$m = \frac{8-2}{4-1} = \frac{6}{3} = 2$

2. (−3, 5) and (2, −5)

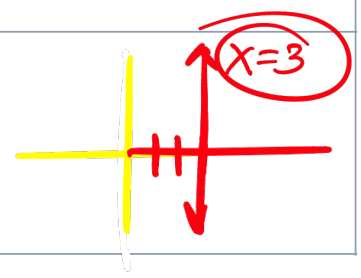
$m = \frac{-5-5}{2-(-3)} = \frac{-10}{5} = -2$

3. (0, −4) and (6, −4)

$m = 0$

4. (3, 1) and (3, 7)

$m = \frac{6}{0}$ = undefined

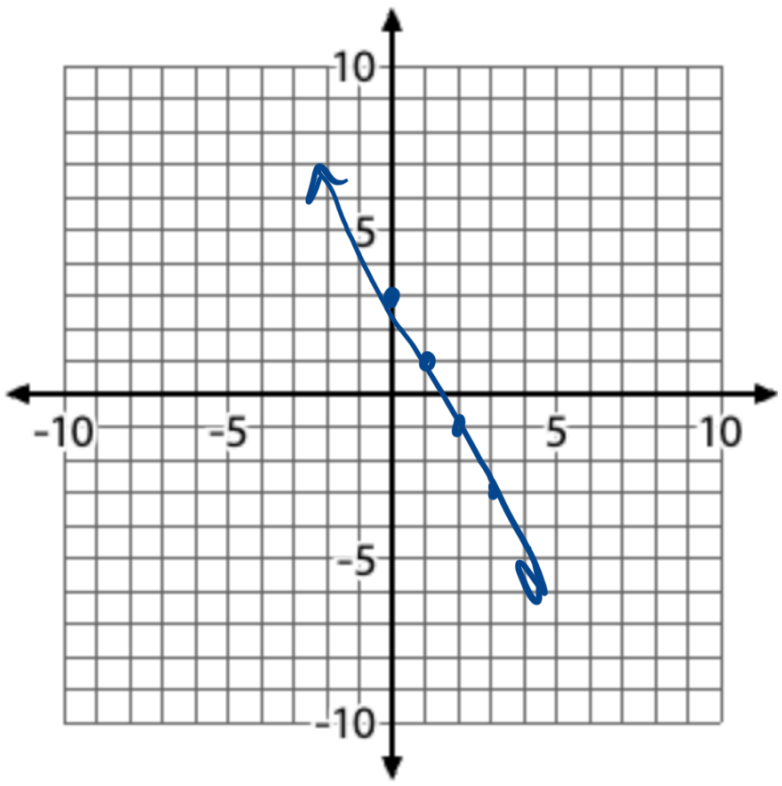


Group B — Graphing with Slope-Intercept Form

Identify the slope and y-intercept, then graph each line on its grid.

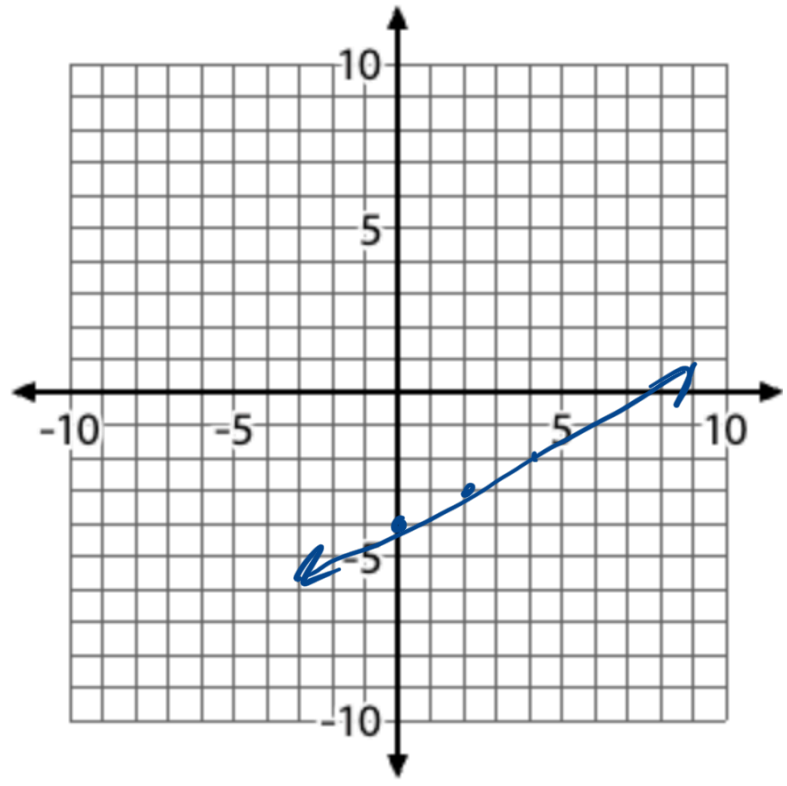
5. y = −2x + 3

y-intercept: (0, 3) slope: m = −2



6. y = ½x − 4

y-intercept: (0, −4) slope: m = ½



Rewrite in slope-intercept form to identify the slope and y-intercept — or explain why it can't be done.

7. 2x − 3y = 6

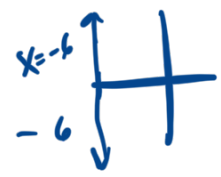
$-3y = -2x + 6$

$y = \frac{-2}{-3}x + \frac{6}{-3}$

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

slope: 2/3 y-intercept: −2

8. x = −6



slope: undefined y-intercept: none

Group C — Writing Equations of Lines

Write the slope-intercept form of the equation of each line. Show your point-slope step.

9. Slope 4, through (2, 3)

$y - 3 = 4(x - 2)$

$y - 3 = 4x - 8$

$y = 4x - 5$

10. Slope −1, through (−3, 5)

$y - 5 = -1(x + 3)$

$y - 5 = -x - 3$

$y = -x + 2$

11. Through (1, 4) and (5, 12)

$m = \frac{12-4}{5-1} = \frac{8}{4} = 2$

$y-4=2(x-1)$

$y-4=2x-2$

$y=2x+2$

$y-12=2(x-5)$

$y-12=2x-10$

$y=2x+2$

12. Through (−2, 7) and (4, −5)

$m = \frac{-5-7}{4-(-2)} = \frac{-12}{6} = -2$

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

$y-7=-2x-4$

$y=-2x+3$

Special cases: a slope of 0 gives a horizontal line; an undefined slope gives a vertical line.

13. Slope 0, through (4, 2)

Horizontal

$y=2$

x = Vertical

y = Horizontal

14. Slope undefined, through (−4, 1)

vertical

$x=-4$

Group D — Parallel and Perpendicular Lines

For each, find the slope-intercept equation of the line through the given point that is (a) parallel to and (b) perpendicular to the given line.

15. Point (0, 5); given line y = 3x − 1

(a) $y=3x+5$

(b) $y=-\frac{1}{3}x+5$

16. Point (1, 1); given line 2x + y = 6

$y=-2x+6$ $m=-2$

(a) $m=-2$

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

$y-1=-2x+2$

$y=-2x+3$

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

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

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

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

Group E — Mixed Applications

Show your work.

17. A printing press was worth $8,000 when new and depreciates $500 per year. Write a linear equation for its value V after t years, then find its value after 6 years.

$-\frac{\$500}{\text{year}}$ ← slope

↑ Lose

$V=8000-500t$

$V=8000-500(6)$

$8000-3000$ $5000

18. A city's population is modeled by P = 1,200t + 45,000, where t is years since 2010. Estimate the population in 2018 (t = 8).

$P(8)=1200(8)+45000$

$=96000+45000$

$=141,000$ people

19. A product is worth $3,000 in 2016 and is expected to decrease in value by $150 per year. Write a linear equation for its value V in terms of the year t (let t = 16 represent 2016).

$t=16$ $V=3000$

$V=3000-150(t-16)$

$V=3000-150t+2400$ $2000=0$

$V=5400-150t$

20. A sandwich shop buys a used pizza oven for $875. After 5 years, the oven's value will be $0 and it will be replaced. Write a linear equation for its value V during those 5 years.

$875 Initial value

$t=0$ $V=875$

$t=5$ $V=0$

$t=5$ yrs $V=0$

$m=\frac{0-875}{5-0}=-171\frac{\$}{\text{yr}}$

$V=875-171t$