Name _____ Date _____

5.4 Notetaking with Vocabulary

I can describe different methods for solving systems of linear equations.
I can solve linear systems by substitution.
I can solve linear systems by elimination.
I can determine the numbers of solutions of linear systems. ⇐

In your own words, write the meaning of each vocabulary term.

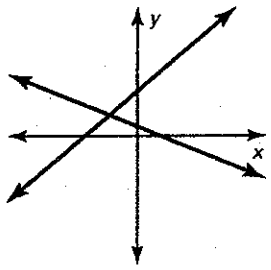
parallel – lines never intersect
– same slope, different y-intercept.

Core Concepts

Solutions of Systems of Linear Equations (2 equations)

A system of linear equations can have *one solution*, *no solution*, or *infinitely many solutions*.

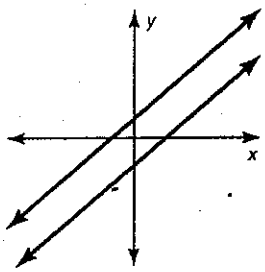
One solution



Lines intersect at 1 point (x, y)

Lines have different slopes.

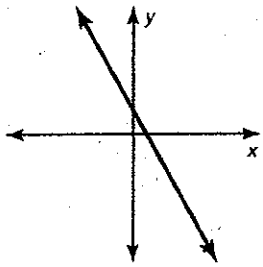
No solution



Lines are parallel and never intersect.

Same slope but different y-int.

Infinitely many solutions



Same line "Lines coincide" intersect at every point on line

Same slope, same y-int.

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5.4 Notetaking with Vocabulary (continued)

In Exercises 1–18, solve the system of linear equations.

1. $y = 3x - 7$
$y = 3x + 4$

$3x - 7 = 3x + 4$
$-3x \quad -3x$

$-7 = 4$ False

No solution

2. $y = 5x - 1$
$y = -5x + 5$

$5x - 1 = -5x + 5$
$+5x \quad +5x$

$10x - 1 = 5$
$+1 \quad +1$

$\frac{10x}{10} = \frac{6}{10}$

$x = .6 = \frac{3}{5}$

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

$y = 3 - 1 = 2$

$(.6, 2)$
$(\frac{3}{5}, 2)$ you must check.

3. $2x - 3y = 10$
$+ \quad -2x + 3y = -10$

$0 = 0$ True

Infinitely many solutions

4. $2x + 3y = 1$
$-2x + 3y = -7$

5. $4x + 3y = 17$
$-8x - 6y = 34$

6. $3x - 2y = 6$
$-9x + 6y = -18$

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5.4 Notetaking with Vocabulary (continued)

7. $5x + 7y = 7$ $\cdot -7$ $\quad -35x - 49y = -49$
$7x + 5y = 5$ $\cdot 5$ $+ \quad 35x + 25y = 25$
$-24y = -24$
$-24 \quad -24$
$y = 1$

$5x + 7(1) = 7$
$5x + 7 = 7$
$-7 \quad -7$
$\frac{5x}{5} = \frac{0}{5}$
$x = 0$

(0, 1)

Check:
$5(0) + 7(1) \stackrel{?}{=} 7$
$7 = 7$ ✓

$7(0) + 5(1) = 5$
$5 = 5$ ✓

8. $y = \frac{2}{3}x + 7$
$y = \frac{2}{3}x - 5$

$\frac{2}{3}x + 7 = \frac{2}{3}x - 5$
$-\frac{2}{3}x \quad -\frac{2}{3}x$
$7 = -5$ False

No solution

9. $-3x + 5y = 15$
$9x - 15y = -45$

initial amts

10. You have \$15 in savings. Your friend has \$25 in savings. You both start saving \$5 per week. Write a system of linear equations that represents this situation. Will you ever have the same amount of savings as your friend? Explain.

rate, rate, initial

$y = mx + b$

① Identify your variables (decide if equations should be in $y = mx + b$ or $Ax + By = C$)

x = # of weeks (ind.)
y = amt. in savings (dep.)

② Write equations

You: $y = 5x + 15$
Friend: $y = 5x + 25$

③ Solve the system

$5x + 15 = 5x + 25$
$-5x \quad -5x$
$15 = 25$ No solution.

The 2 lines are parallel. I will never have the same amount as friend. Though we are saving at the same rate, he started with more so he will always have more in his account.

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