RLP-ALG1A · RLP Algebra 1A — Data, Linear Equations and Systems

Unit 3: Linear Relationships, Inequalities and Systems in Two Variables

Practice Workbook. The same problems, in the same order, as the Practice sections of the online lessons.

Name _____ Period _____

Lesson 3.1 — A Line Is a Set of Solutions: Equations in Two Variables

FLUENCY

1. Find the slope of the line through (1, −7) and (5, 8).

2. Find the slope of the line through (−5, 4) and (3, 2).

3. Find the slope of the line through (8, 5) and (9, −2).

4. Find the slope of the line through (−7, 1) and (−5, 5).

5. Write the equation, in slope-intercept form, of the line through (5, 33/2) and (7, 39/2).

6. Write the equation, in slope-intercept form, of the line through $(-5, -9)$ and $(-2, -3)$.

7. Write the equation, in slope-intercept form, of the line through $(-3, -2)$ and $(-1, -4)$.

8. Write the equation of the line with slope -5 through $(-6, 26)$.

9. Write the equation of the line with slope 5 through $(2, 12)$.

APPLICATION

10. A school garden has \$150 for seedlings at \$5 and shrubs at \$15. Write the budget equation, find both intercepts and the slope, and say what the slope means.

11. An electric car's battery reads 38% after 2 hours of charging and 83% after 5 hours (illustrative, assume linear). Write the charge as a function of hours and estimate when it reaches 100%.

12. Rewrite $4x - 6y = 18$ in slope-intercept form and give the slope and y-intercept.

CHALLENGE

13. Find k so that the line through (2, k) and (6, 11) has slope 3/2.

REVIEW

14. Solve: $-x - 6 = 7x + 34$

15. Solve: $|x - 1| = 4$

Lesson 3.2 — Solving Systems: Graphing, Substitution and Elimination

FLUENCY

1. Solve the system: $6x + 2y = 6$ and $-5x - 6y = 21$
2. Solve the system: $-2x - 2y = 10$ and $-2x - 5y = 16$
3. Solve the system: $3x + y = 7$ and $-4x - 2y = -6$
4. Solve the system: $-2x - y = -15$ and $5x + 6y = 55$
5. Solve the system by substitution: $4x - 5y = 8$ and $6x + 3y = -30$
6. Solve the system by substitution: $4x + 6y = 26$ and $5x + 2y = 5$

7. Solve the system by elimination: $4x + y = 10$ and $4x + 4y = -8$

8. Solve the system by elimination: $-6x + 6y = 48$ and $-2x - 4y = -8$

APPLICATION

9. A school musical sells 250 tickets for $1,940. Adult tickets cost $10 and student tickets $6. How many of each were sold?

10. A coffee cart sells drip coffee for $3 and lattes for $5. It sells 120 drinks for $460. How many of each?

11. How many liters of 40% juice and 10% juice make 30 L of 20% juice?

CHALLENGE

12. Graphs of y = 1.25x − 2 and y = −0.4x + 7.9 cross at one point. Estimate it from a graph, then find it exactly.

REVIEW

13. Solve and graph on a number line: $3x - 6 \leq 3$

14. For the data 5, 7, 10, 12, 15, 23, 27, 31, 31, 32: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

Lesson 3.3 — Why Elimination Works: A Proof About Systems

FLUENCY

1. Solve the system by elimination: $6x + 5y = -17$ and $-x + 3y = -1$

2. Solve the system by elimination: $-3x - 5y = -14$ and $5x + 2y = -2$

3. Solve the system by elimination: $-6x - 4y = -20$ and $3x - y = -5$

4. Solve the system by elimination: $3x + 4y = -13$ and $-5x - 6y = 21$

5. Solve $3x - 6y = 9$ and $x - 2y = 3$.

6. Solve $2x + 5y = 7$ and $4x + 10y = 9$.

7. Solve $x + y = 5$ and $x - y = 1$.

APPLICATION

8. Add the equations $2x + y = 11$ and $x - y = 1$. Solve the system, and check that the solution also satisfies the sum equation.

9. For which k does the system $6x + ky = 10$ and $3x + 2y = 5$ have infinitely many solutions? For which k does $6x + ky = 12$, $3x + 2y = 5$ have none?

10. Plan A costs \$20 plus \$0.05 per text; plan B costs \$15 plus \$0.05 per text. Solve the system and interpret the result.

CHALLENGE

11. Prove that any solution of $x + 2y = 7$ and $3x - y = 7$ also satisfies $4x + y = 14$. Then find the solution and verify all three equations.

REVIEW

12. Solve and graph: $|x + 1| \geq 4$

13. Solve: $-4(x + 7) - 7 = -7$

Lesson 3.4 — Constraints and Half-Planes: Systems of Linear Inequalities

FLUENCY

1. Write the equation, in slope-intercept form, of the line through (6, 18) and (9, 30).
2. Write the equation, in slope-intercept form, of the line through (6, −40) and (12, −76).
3. Is (3, −1) a solution of $2x - y > 6$?
4. Is (0, 0) a solution of $y \leq -2x + 4$? Which side of the boundary do you shade?
5. Is the boundary of $y < 3x - 2$ solid or dashed?
6. Is (2, 5) in the solution set of $y \geq x + 2$ and $y < -x + 8$?

7. Is (4, 1) in the solution set of $x + y \le 20$ and $15x + 20y \ge 240$?

APPLICATION

8. A student works café shifts at \$16.50/hour and tutors at \$22/hour (illustrative), at most 18 hours a week, and needs at least \$300. Is 8 café and 8 tutoring hours viable? Is 12 and 4?

9. A club sells T-shirts for \$15 and hats for \$10, needs at least \$900 and can carry at most 80 items. Write the system and test 40 shirts and 30 hats.

10. In the café problem, if she works 6 café hours, how many whole tutoring hours does she need?

CHALLENGE

11. Find the corners of the region $x \geq 0$, $y \geq 0$, $x + y \leq 18$, $16.5x + 22y \geq 300$, to two decimals.

REVIEW

12. Solve and graph on a number line: $6x + 9 > -9$

13. For the data 13, 16, 28, 30, 30, 37, 38: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

Unit 3 checkpoint

1. What is the slope of $3x + 12y = 120$?
   A. $-1/4$
   B. -4
   C. $1/4$
   D. $3/12$

2. The y-intercept of $3x + 12y = 120$ is $(0, _____)$.

3. True or false: Every point on the graph of an equation is a solution of the equation.

4. Solve $x + y = 200$ and $8x + 5y = 1210$.
   A. (70, 130)
   B. (130, 70)
   C. (100, 100)
   D. (60, 140)

5. For $3x + 2y = 16$ and $5x - 2y = 8$, $x =$ _____ and $y =$ _____.
6. Elimination on a system gives $0 = -7$. The system has…
   A. no solution
   B. one solution
   C. infinitely many
   D. the solution $x = 0$
7. True or false: Replacing one equation by its sum with a multiple of the other can create new solutions.
8. Which point satisfies $x + y \le 20$ and $15x + 20y \ge 240$?
   A. (10, 6)
   B. (5, 5)
   C. (18, 5)
   D. (2, 8)
9. The boundary of $y > 2x + 1$ should be…
   A. dashed
   B. solid
   C. vertical
   D. not drawn
10. The garden constraints $2x + y \le 30$ and $3x + 2y \le 50$ meet at (_____, _____).
11. True or false: A solution of a system must satisfy every equation in it.
12. Which option breaks the space constraint $2x + y \le 30$?
    A. (12, 8)
    B. (10, 10)
    C. (15, 0)
    D. (5, 20)

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