



BATTLE SHEET · CHAPTER 6

Systems of Equations and Inequalities

MathBound Standard Algebra 1 · Island 6: Kitecliff Reach

Name _____ Class _____ Date _____

The foes of Kitecliff Reach are out, and each one fights with its own kind of Algebra 1 problem. **Defeat each foe by solving its problems.** Show your work in the space on each card, then circle the letter of your answer.

The foes on this sheet



Searchlight Scout

Two searchlight beams that cross at one point: solving systems by graphing.

Problems 1–2 · Lesson 6.1 · Battle it online: **play.mathbound.org/alg1/?practice=r5.solve-by-graphing**



Swap Shuttle

Swaps one part for its twin: solving systems by substitution.

Problems 3–4 · Lesson 6.2 · Battle it online: **play.mathbound.org/alg1/?practice=r5.solve-by-substitution**



Cancel Crab

Two matching claws that clap and cancel: solving systems by elimination.

Problems 5–6 · Lesson 6.3 · Battle it online: **play.mathbound.org/alg1/?practice=r5.solve-by-elimination**



Brew Blender

Pours two flasks into one: mixture, coin and ticket problems.

Problems 7–9 · Lesson 6.4 · Battle it online: **play.mathbound.org/alg1/?practice=r5.mixture-applications-with-systems**



Shade Painter

Paints one side of a line: graphing inequalities in two variables.

Problems 10–12 · Lesson 6.5 · Battle it online: **play.mathbound.org/alg1/?practice=r4.linear-inequalities**



Overlap Roller

Two paint rollers whose stripes overlap: systems of inequalities.

Problems 13–14 · Lesson 6.6 · Battle it online: **play.mathbound.org/alg1/?practice=r5.systems-of-linear-inequalities**

> **For teachers.** 14 problems from MathBound's own question engine, on chapter 6 of MathBound Standard Algebra 1. The answer key, with worked steps, is at the end. Free to copy for your classes.
>
> Every foe here is also a battle in MathBound, the Algebra 1 adventure game: free for students, no sign-up, at **play.mathbound.org**. The link under each foe opens practice battles with it. Classes, progress by skill and assignments: **mathbound.org/teachers**.

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FOE 1 OF 6

Searchlight Scout

Two searchlight beams that cross at one point: solving systems by graphing. Lesson 6.1. Battle it:
play.mathbound.org/alg1/?practice=r5.solve-by-graphing

1 Lesson 6.1

Is $(3, 6)$ a solution of the system $-x - 2y = -15$ and $2x + 3y = 25$?

A. No, it satisfies only the second equation

B. No, it satisfies neither equation

C. Yes, it satisfies both equations

D. No, it satisfies only the first equation

WORK

2 Lesson 6.1

How many solutions does the system $-4x - 3y = -3$ and $-12x - 9y = -9$ have?

A. Exactly two solutions

B. No solution

C. Infinitely many solutions

D. Exactly one solution

WORK



FOE 2 OF 6

Swap Shuttle

Swaps one part for its twin: solving systems by substitution. Lesson 6.2. Battle it:
play.mathbound.org/alg1/?practice=r5.solve-by-substitution

3 Lesson 6.2

At what value of x do the lines $y = 3x - 15$ and $y = -x + 9$ cross?

A. -6 **B.** -24

C. 3 **D.** 6

WORK

4 Lesson 6.2

Which system has infinitely many solutions?

A. $y = -3x + 11$ and $0.5y = 6.5 - 1.5x$

B. $y = 2x + 1$ and $2y = 1 + 5x$

C. $y = -2x + 8$ and $0.5y = 4 - x$

D. $y = x + 10$ and $3y = 25 + 2x$

WORK

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FOE 3 OF 6

Cancel Crab

Two matching claws that clap and cancel: solving systems by elimination. Lesson 6.3. Battle it:
play.mathbound.org/alg1/?practice=r5.solve-by-elimination

5 Lesson 6.3

Subtract the second equation from the first: $-5x - 4y = -1$ and $-2x - 4y = 7$. Which equation results?

A. $-7x = 6$ **B.** $-3x = 6$

C. $-3x - 8y = -8$ **D.** $-3x = -8$

WORK

6 Lesson 6.3

In $3x - 5y = -7$ and $6x - 3y = -12$, which one multiplication lets you add the equations to eliminate x?

A. Multiply the second equation by 2

B. Multiply the first equation by -2

C. Multiply the first equation by 2

D. Multiply the second equation by -2

WORK



FOE 4 OF 6

Brew Blender

Pours two flasks into one: mixture, coin and ticket problems. Lesson 6.4. Battle it:
play.mathbound.org/alg1/?practice=r5.mixture-applications-with-systems

7 Lesson 6.4

A jar holds 34 coins, all dimes and quarters, worth \$6.25. How many quarters are there?

A. 25 **B.** 15

C. 19 **D.** 34

WORK

8 Lesson 6.4

How many gallons of water must evaporate from 20 gallons of 4% salt water to make it 20% salt water?

A. 3.2 gallons **B.** 20 gallons

C. 4 gallons **D.** 16 gallons

WORK

9 Lesson 6.4

An investor puts \$20,000 into two accounts paying 3% and 6% simple interest a year. Over 5 years they earn \$4,650 in interest. How much went into the 3% account?

A. \$9,500 **B.** \$11,000 **C.** \$9,000 **D.** \$10,000

WORK

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FOE 5 OF 6

Shade Painter

Paints one side of a line: graphing inequalities in two variables. Lesson 6.5. Battle it:
play.mathbound.org/alg1/?practice=r4.linear-inequalities

10 Lesson 6.5

Which ordered pair is NOT a solution to $y < x + 3$?

A. $(-3, -3)$ **B.** $(3, 8)$

C. $(2, 4)$ **D.** $(1, 2)$

WORK

11 Lesson 6.5

Which point satisfies $4y - 3 > 9$?

A. $(4, 5)$ **B.** $(-3, 1)$

C. $(0, 1)$ **D.** $(-1, 2)$

WORK

12 Lesson 6.5

What boundary line does $3(x + 4) - 2y > -x + 36$ have?

A. A dashed line at $4x - 2y = 24$ **B.** A dashed line at $4x - 2y = 48$

C. A solid line at $4x - 2y = 24$ **D.** A dashed line at $2x - 2y = 24$

WORK



FOE 6 OF 6

Overlap Roller

Two paint rollers whose stripes overlap: systems of inequalities. Lesson 6.6. Battle it:
play.mathbound.org/alg1/?practice=r5.systems-of-linear-inequalities

13 Lesson 6.6

$(-4, -15)$ is a solution of which system?

A. $y < 3x - 4$ and $y > 4x + 5$

B. $y > 3x - 4$ and $y > 4x + 5$

C. $y > 3x - 4$ and $y < 4x + 5$

D. $y < 3x - 4$ and $y < 4x + 5$

WORK

14 Lesson 6.6

A student works at most 20 hours a week across two jobs paying \$10 and \$15 an hour, must earn at least \$200, and must work at least 6 hours at the first job. Let x be the hours at the first job and y at the second. Which system models this?

A. $x + y \leq 20, 10x + 15y \geq 200$ and $x \leq 6$

B. $x + y \leq 20, 10x + 15y \geq 200$ and $y \geq 6$

C. $x + y \geq 20, 10x + 15y \geq 200$ and $x \geq 6$

D. $x + y \leq 20, 10x + 15y \geq 200$ and $x \geq 6$

WORK

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Answer key · Chapter 6: Systems of Equations and Inequalities

Each answer is followed by its worked steps, as the game shows them after a battle.

Searchlight Scout

1. **D**: No, it satisfies only the first equation

1. Substitute $(3, 6)$ into each equation.
2. The first holds and the second fails.
3. No, it satisfies only the first equation.

2. **C**: Infinitely many solutions

1. Identical equations are the same line, so every point on it solves both.
2. So it has infinitely many solutions.

Swap Shuttle

3. **D**: 6

1. Both are y, so substitute one into the other: $3x - 15 = -x + 9$.
2. $4x = 24$, so $x = 6$.

4. **C**: $y = -2x + 8$ and $0.5y = 4 - x$

1. Rearrange each second equation and compare it with the first.
2. Rearranged, the second is exactly a multiple of the first: everything cancels and leaves something always true.

Cancel Crab

5. **D**: $-3x = -8$

1. The y terms are equal, so subtracting removes them.
2. x terms: $-5 - (-2) = -3$; constants: $-1 - (7) = -8$. So $-3x = -8$.

6. **B**: Multiply the first equation by -2

1. The $x-$ coefficients are 3 and 6: the second is 2 times the first.
2. Multiplying the first by -2 makes its $x-$ term -6, the opposite of 6, so adding cancels x.

Brew Blender

7. **C**: 19

1. $d + q = 34$ and $10d + 25q = 625$.
2. $15q = 285$, so $q = 19$.

8. **D**: 16 gallons

1. Evaporating removes water, not salt: the salt stays $0.04(20) = 0.8$ gallons.
2. $0.8 = 0.2(20 - w)$, so $w = 16$.

9. **C**: \$9,000

1. Over 5 years the interest is 5 times a year's: $0.03x(5) + 0.06y(5) = 4650$, with $x + y = 20000$.
2. One year's interest is 930; solving gives $x =$ \$9,000.

Shade Painter

10. **B**: $(3, 8)$

1. A solution has y below the line $y = x + 3$.
2. At $x = 3$ the line is at 6, and $(3, 8)$ is above it.

11. **A**: $(4, 5)$

1. Solve: $y > 3$. Only the $y-$ coordinate matters.
2. $(4, 5)$ has $y = 5$, which fits.

12. **A**: A dashed line at $4x - 2y = 24$

1. Distribute 3, then move the x-terms to the left and the numbers to the right: $4x - 2y > 24$.
2. The boundary is $4x - 2y = 24$; $>$ leaves out it, so the line is dashed.

Overlap Roller

13. **C**: $y > 3x - 4$ and $y < 4x + 5$

1. Substitute $(-4, -15)$ into each inequality of each system.
2. Only $y > 3x - 4$ and $y < 4x + 5$ holds twice.

14. **D**: $x + y \leq 20, 10x + 15y \geq 200$ and $x \geq 6$

1. Hours: $x + y \leq 20$. Pay: $10x + 15y \geq 200$.
2. "At least 6 hours at the first job": $x \geq 6$.

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