



BATTLE SHEET · CHAPTER 3

Linear Inequalities

MathBound Standard Algebra 1 · Island 3: Lantern Isle

Name _____ Class _____ Date _____

The foes of Lantern Isle 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



Greater Gator

Its jaws always face the bigger side: solving and graphing inequalities.

Problems 1–4 · Lessons 3.1–3.3 · Battle it online: **play.mathbound.org/alg1/?practice=r2.linear-inequalities**



Phrase Parrot

Repeats words as symbols: the language of algebra.

Problems 5–7 · Lessons 3.1, 3.4 · Battle it online: **play.mathbound.org/alg1/?practice=r1.use-the-language-of-algebra**



Rope-Bridge Bandit

Guards the bridge between two posts: compound inequalities.

Problems 8–11 · Lessons 3.4, 3.5 · Battle it online: **play.mathbound.org/alg1/?practice=eq.inequalities**



Budget Buccaneer

Can spend at most what is in the purse: inequality word problems.

Problems 12–14 · Lesson 3.6 · Battle it online: **play.mathbound.org/alg1/?practice=r3.linear-inequalities-applications**

> **For teachers.** 14 problems from MathBound's own question engine, on chapter 3 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 4

Greater Gator

Its jaws always face the bigger side: solving and graphing inequalities. Lessons 3.1–3.3. Battle it:
play.mathbound.org/alg1/?practice=r2.linear-inequalities

1 Lesson 3.1

Which describes the graph of $x < 4$?

A. An open circle at 4, shaded to the left

B. An open circle at 4, shaded to the right

C. A closed circle at 4, shaded to the left

D. A closed circle at 4, shaded to the right

WORK

2 Lesson 3.2

Solve $x - 15 > -5$. Write the solution in set-builder notation.

A. $\{x \mid x > -10\}$ **B.** $\{x \mid x > 10\}$

C. $\{x \mid x < 10\}$ **D.** $\{x \mid x \geq 10\}$

WORK

3 Lesson 3.2

Solve: $-2x > -19$

A. $x < -\frac{19}{2}$ **B.** $x < \frac{19}{2}$

C. $x > \frac{19}{2}$ **D.** $x < \frac{2}{19}$

WORK

4 Lesson 3.3

Translate and solve: The difference of a number and 4 is greater than 5 times the number.

A. $n > 1$ **B.** $n < 1$

C. $n > -1$ **D.** $n < -1$

WORK



FOE 2 OF 4

Phrase Parrot

Repeats words as symbols: the language of algebra. Lessons 3.1, 3.4. Battle it:
play.mathbound.org/alg1/?practice=r1.use-the-language-of-algebra

5 Lesson 3.1

Write with a symbol: y is at least 24.

A. $y \leq 24$ **B.** $y > 24$

C. $y \geq 24$ **D.** $y < 24$

WORK

6 Lesson 3.1

Write with symbols: t is greater than or equal to -3 and less than 0.

A. $-3 < t \leq 0$ **B.** $-3 \leq t < 0$

C. $-3 < t < 0$ **D.** $-3 \leq t \leq 0$

WORK

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FOE 2 OF 4

Phrase Parrot (continued)

Repeats words as symbols: the language of algebra. Lessons 3.1, 3.4. Battle it:
play.mathbound.org/alg1/?practice=r1.use-the-language-of-algebra

7 Lesson 3.1

Which value of y makes $-1 \leq y < 5$ true?

A. 3 **B.** -2 **C.** 6 **D.** 5

WORK



FOE 3 OF 4

Rope-Bridge Bandit

Guards the bridge between two posts: compound inequalities. Lessons 3.4, 3.5. Battle it:
play.mathbound.org/alg1/?practice=eq.inequalities

8 Lesson 3.4

Solve: $-8 \leq 4x < 4$

A. $-2 < x \leq 1$ **B.** $-12 \leq x < 0$

C. $-1 \leq x < 2$ **D.** $-2 \leq x < 1$

WORK

9 Lesson 3.4

Solve: $0 \leq \frac{x}{2} + 2 \leq 2$

A. $-4 \leq x \leq 0$ **B.** $4 \leq x \leq 8$

C. $-2 \leq x \leq 2$ **D.** $-2 \leq x \leq 0$

WORK

10 Lesson 3.4

Solve $4x - 5 \leq -21$ or $4x - 2 > -6$. Write the solution in interval notation.

A. $(-\infty, -4] \cup (-1, \infty)$

B. $(-\infty, -4) \cup [-1, \infty)$

C. $(-\infty, -4] \cup [-1, \infty)$

D. $(-4, -1]$

WORK

11 Lesson 3.5

Solve: $|x - 5| + 7 > 4$

A. all real numbers **B.** no solution

C. $x < 2$ or $x > 8$ **D.** $x = 5$

WORK

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FOE 4 OF 4

Budget Buccaneer

Can spend at most what is in the purse: inequality word problems. Lesson 3.6. Battle it:
play.mathbound.org/alg1/?practice=r3.linear-inequalities-applications

12 Lesson 3.6

Translate: a number divided by 8 is at least 24.

A. $\frac{n}{8} \leq 24$ **B.** $\frac{8}{n} \geq 24$

C. $\frac{n}{8} \geq 24$ **D.** $\frac{n}{8} > 24$

WORK

13 Lesson 3.6

A rental car costs $40 a week plus $0.25 a mile. How many miles can be driven on a budget of $75?

A. 35 miles **B.** 1.9 miles

C. 300 miles **D.** 140 miles

WORK

14 Lesson 3.6

Translate: the quotient of a number and 6 is at least the number decreased by 7.

A. $\frac{n}{6} \geq n - 7$ **B.** $\frac{n}{6} > n - 7$ **C.** $\frac{n}{6} \geq 7 - n$ **D.** $\frac{n}{6} \geq n + 7$

WORK

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Answer key · Chapter 3: Linear Inequalities

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

Greater Gator

1. **A**: An open circle at 4, shaded to the left
1. $<$ is strict, so the endpoint is not included and the circle is open.
2. x is less than 4, so shade to the left.

2. **B**: $\{x \mid x > 10\}$
1. Add 15 to both sides: $x > 10$.
2. As a set: $\{x \mid x > 10\}$, the numbers x with $x > 10$.

3. **B**: $x < \dfrac{19}{2}$
1. Divide both sides by -2, which reverses the inequality.
2. $x < \dfrac{-19}{-2} = \dfrac{19}{2}$.

4. **D**: $n < -1$
1. The sentence is $n - 4 > 5n$.
2. Subtract $5n$ and add 4: $-4n > 4$.
3. Divide by -4 and reverse the symbol: $n < -1$.

Phrase Parrot

5. **C**: $y \geq 24$
1. "is at least 24": y can be the number itself or anything above it.
2. That is $y \geq 24$.

6. **B**: $-3 \leq t < 0$
1. "Greater than -3" puts -3 on the left of t; "less than 0" puts 0 on the right.
2. Together: $-3 \leq t < 0$.

7. **A**: 3
1. y must be at least -1 and less than 5.
2. Only 3 passes both tests.

Rope-Bridge Bandit

8. **D**: $-2 \leq x < 1$
1. Divide all three parts by 4.
2. $-2 \leq x < 1$

9. **A**: $-4 \leq x \leq 0$
1. Subtract 2: $-2 \leq \dfrac{x}{2} \leq 0$.
2. Multiply by 2: $-4 \leq x \leq 0$.

10. **A**: $(-\infty, -4] \cup (-1, \infty)$
1. Solve each part: $x \leq -4$, or $x > -1$.
2. -4 is kept and -1 is not: $(-\infty, -4] \cup (-1, \infty)$.

11. **A**: all real numbers
1. Subtract 7: $|x - 5| > -3$.
2. An absolute value is never negative, so it is always above -3: all real numbers.

Budget Buccaneer

12. **C**: $\dfrac{n}{8} \geq 24$
1. "A number divided by 8" is $\dfrac{n}{8}$.
2. "At least" means no smaller than, $\geq$: $\dfrac{n}{8} \geq 24$.

13. **D**: 140 miles
1. $40 + 0.25m \leq 75$.
2. $0.25m \leq 35$, so $m \leq 140$ miles.

14. **A**: $\dfrac{n}{6} \geq n - 7$
1. "The quotient of a number and 6" is $\dfrac{n}{6}$; "the number decreased by 7" is $n - 7$.
2. "Is at least" is $\geq$: $\dfrac{n}{6} \geq n - 7$.

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