

BATTLE SHEET · CHAPTER 12

Data Analysis

MathBound Standard Algebra 1 · Island 12: Galeheart Citadel

Name _____ Class _____ Date _____

The foes of Galeheart Citadel 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



Fair-Share Otto

Levels every pile to a fair share: mean and median.

Problems 1–2 · Lesson 12.1 · Battle it online: **play.mathbound.org/alg1/?practice=stat.center**



Box-Whisker Cat

A box of a body with long whiskers: range, quartiles and the five-number summary.

Problems 3–5 · Lessons 12.2, 12.4 · Battle it online: **play.mathbound.org/alg1/?practice=stat.spread**



Sheepdog Sprocket

Measures how far each sheep strays from the middle: mean absolute deviation and standard deviation.

Problems 6–7 · Lesson 12.2 · Battle it online: **play.mathbound.org/alg1/?practice=stat.deviation**



Stem-and-Leaf Sprig

A clockwork plant of stems and leaves: kinds of data and stem-and-leaf plots.

Problems 8–10 · Lesson 12.3 · Battle it online: **play.mathbound.org/alg1/?practice=stat.data**



Table-Top Ted

A clockwork table with a grid on top: two-way tables.

Problems 11–12 · Lesson 12.5 · Battle it online: **play.mathbound.org/alg1/?practice=stat.two-way**



Ticker-Tape Tilly

Reads a long ticker tape: regression output.

Problems 13–14 · Lesson 12.6 · Battle it online: **play.mathbound.org/alg1/?practice=stat.regression**

> **For teachers.** 14 problems from MathBound's own question engine, on chapter 12 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

Fair-Share Otto

Levels every pile to a fair share: mean and median. Lesson 12.1. Battle it: **play.mathbound.org/alg1/?practice=stat.center**

1 Lesson 12.1

Students were asked how many pets they have. What is the mean number of pets?

Pets	0	1	2	3	4
Students	3	0	2	2	2

A. 18 **B.** 2 **C.** 3.6 **D.** 1.8

WORK

2 Lesson 12.1

A student's test scores are $73, 63, 71, 94$. What score on the next test makes the mean of all 5 scores exactly 80?

A. 76.2 **B.** 99 **C.** 19 **D.** 80

WORK



FOE 2 OF 6

Box-Whisker Cat

A box of a body with long whiskers: range, quartiles and the five-number summary. Lessons 12.2, 12.4. Battle it: **play.mathbound.org/alg1/?practice=stat.spread**

3 Lesson 12.2

The table shows how many goals a team scored in its games. What is the range of the goals scored?

Goals	0	1	2	3	4	5	6
Games	0	3	4	0	2	1	1

A. 5 **B.** 4 **C.** 6 **D.** 11

WORK

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FOE 2 OF 6

Box-Whisker Cat (continued)

A box of a body with long whiskers: range, quartiles and the five-number summary. Lessons 12.2, 12.4. Battle it: play.mathbound.org/alg1/?practice=stat.spread

4 Lesson 12.4

The 10 test scores in a class are $54, 61, 64, 67, 78, 84, 91, 92, 94, 95$. What percent of the scores are less than 67?

A. 40%
B. 30%
C. 60%
D. 70%

WORK

5 Lesson 12.4

What is the third quartile of $9, -10, -18, -20, 2, 1, -20, 9, 27, -4, 14$?

A. 14
B. 1
C. 9
D. 27

WORK



FOE 3 OF 6

Sheepdog Sprocket

Measures how far each sheep strays from the middle: mean absolute deviation and standard deviation. Lesson 12.2. Battle it: play.mathbound.org/alg1/?practice=stat.deviation

6 Lesson 12.2

What is the mean absolute deviation (MAD) of $22, 24, 27, 19$?

A. 10
B. 3.33
C. 0
D. 2.5

WORK

7 Lesson 12.2

What is the standard deviation of $11, 5, 3, 11, 9, 9$? Divide by the number of values.

A. 54
B. 3
C. 3.29
D. 9

WORK

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FOE 4 OF 6

Stem-and-Leaf Sprig

A clockwork plant of stems and leaves: kinds of data and stem-and-leaf plots. Lesson 12.3. Battle it:
play.mathbound.org/alg1/?practice=stat.data

8 Lesson 12.3

Why is this a statistical question? How tall are the trees in the park?

A. It has one correct answer

B. The answers vary, so the data will show variability

C. It starts with the word how

D. It asks for a number

WORK

9 Lesson 12.3

The stem-and-leaf plot shows the points a team scored in its games.

Stem	Leaf
4	0 3 8 9
5	
6	5
7	1 1 3 5 6 6

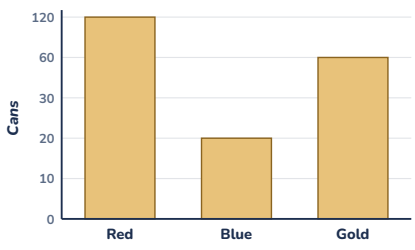
Key: 4|4 means 44. What is the interquartile range?

A. 75 **B.** 27 **C.** 36 **D.** 48

WORK

10 Lesson 12.3

The bar graph shows the cans each team collected for a food drive. How many times as many cans as the Gold team did the Red team collect?



A. 60 **B.** 1

C. 1.25 **D.** 2

WORK

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FOE 5 OF 6

Table-Top Ted

A clockwork table with a grid on top: two-way tables. Lesson 12.5. Battle it: **play.mathbound.org/alg1/?practice=stat.two-way**

11 Lesson 12.5

What percent of all the viewers are children?

	Liked the film	Did not	Total
Adults	14	17	31
Children	15	4	19
Total	29	21	50

A. 62% **B.** 38% **C.** 58% **D.** 30%

WORK

12 Lesson 12.5

There are 50 adults, and 20% of them liked the film. In all, 20 viewers liked the film. What percent of the viewers who liked the film are adults?

A. 20% **B.** 14.3% **C.** 50% **D.** 28.6%

WORK



FOE 6 OF 6

Ticker-Tape Tilly

Reads a long ticker tape: regression output. Lesson 12.6. Battle it: **play.mathbound.org/alg1/?practice=stat.regression**

13 Lesson 12.6

A calculator fit a line to data on years since 2015(x) and tickets sold, in thousands (y).

LinReg
$y = ax + b$
$a = 3.1$
$b = 24.5$
$r^2 = 0.9409$
$r = 0.97$

What does the line predict for y when $x = 4$?

A. 36.9 **B.** 12.4 **C.** 101.1 **D.** -12.1

WORK

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14

Lesson 12.6

A calculator fit a quadratic to the height of a ball in meters (y) against the time in seconds (x).

QuadReg
$y = ax^2 + bx + c$
$a = -4.9$
$b = 29.4$
$c = 1$
$r^2 = 0.98$

What does the value of c tell you?

A. The ball was about 1 meters high when it was thrown

B. The ball rose about 1 meters each second

C. The ball reached a greatest height of about 1 meters

D. The ball was highest after about 1 seconds

WORK

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Answer key · Chapter 12: Data Analysis

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

Fair-Share Otto

1. B: 2

1. There are 9 students, with 18 pets between them.
2. $\frac{18}{9} = 2$.

2. B: 99

1. 5 scores with mean 80 add to 400.
2. $400 - 301 = 99$.

Box-Whisker Cat

3. A: 5

1. Only values that happened count: from 1 to 6 goals.
2. Range $= 6 - 1 = 5$.

4. B: 30%

1. 3 of the 10 scores are less than 67: count the values before it in the ordered list.
2. $\frac{3}{10} = 30\%$, so 67 sits at the $30th$ percentile of the class.

5. C: 9

1. In order: $-20, -20, -18, -10, -4, 1, 2, 9, 9, 14, 27$. The median is the $6th$ value, 1, and is left out of both halves.
2. The upper half is $2, 9, 9, 14, 27$, whose median is 9.

Sheepdog Sprocket

6. D: 2.5

1. The mean is $\frac{92}{4} = 23$.
2. The distances from the mean are $1, 1, 4, 4$.
3. MAD $= \frac{10}{4} = 2.5$.

7. B: 3

1. The mean is 8; the squared deviations add up to 54.
2. Variance: $\frac{54}{6} = 9$.
3. Standard deviation: $\sqrt{9} = 3$.

Stem-and-Leaf Sprig

8. B: The answers vary, so the data will show variability

1. What makes a question statistical is variability in its answers.
2. The answers vary, so the data will show variability

9. B: 27

1. Split the ordered values at the median: $Q1 = 48, Q3 = 75$.
2. IQR $= 75 - 48 = 27$.

10. D: 2

1. The marks on the scale are evenly spaced, but their numbers are not: $0, 10, 20, 30, 60, 120$. So read each bar's number, not its height.
2. The bars reach 60 and 120, so $\frac{120}{60} = 2$.

Table-Top Ted

11. B: 38%

1. The children row totals 19, out of 50 in all.
2. $\frac{19}{50} = 38\%$.

12. C: 50%

1. 20% of 50: 10 adults liked the film.
2. Out of the 20: $\frac{10}{20} = 50\%$.

Ticker-Tape Tilly

13. A: 36.9

1. The line is $y = 3.1x + 24.5$.
2. At $x = 4$: $3.1 \cdot 4 + 24.5 = 36.9$.

14. A: The ball was about 1 meters high when it was thrown

1. At $x = 0$ the model gives $y = c$: the height at the moment of the throw.
2. The ball was about 1 meters high when it was thrown

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