

SIGMABUDGIE · GRADE 3

Graphs with Fractions

A gentle walkthrough & a 24-question exam

Part 1 walks through bar graphs, pictographs, and line plots from the very beginning, with drawings. Part 2 is a 24-question exam that starts easy and slowly builds to harder, ISEE-style reasoning questions. Work through the lesson together first, then let your child try the exam. The answer key at the back explains every question.

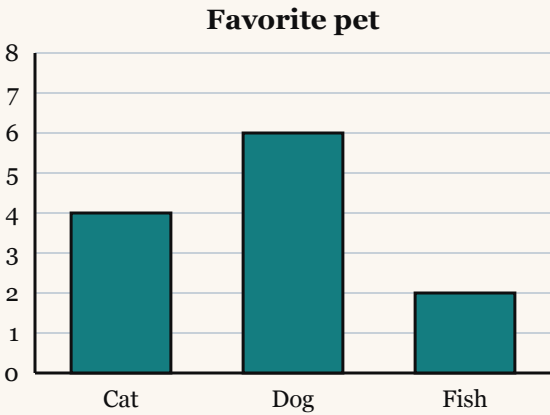
1 · A graph is a picture of counts

We asked 12 kids, "What is your favorite pet?" and made a **tally mark** for each answer. Then we turned the tallies into **bars**.

The taller the bar, the more kids picked it. Dog wins: its bar is the tallest.



the tally chart



the same counts as a bar graph

2 · How to read a bar graph

Every bar graph has three helpers: a **title** (what it is about), **labels** along the bottom (the choices), and **numbers** up the side (how many).

To read a bar, put your finger on the **top of the bar** and slide it left to the numbers. Leo's bar stops at **3**, so Leo read 3 books.

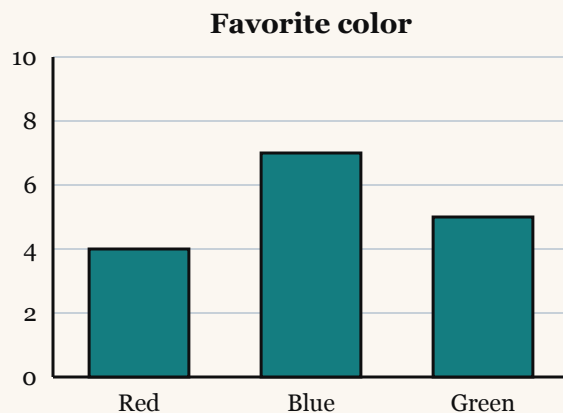


Mia 6, Leo 3, Ava 7

3 • When the numbers skip

Sometimes the side counts by **2s**: 0, 2, 4, 6, 8, 10. Then a bar can stop **between** two lines.

Halfway between 4 and 6 is **5**. Halfway between 6 and 8 is **7**. Green stops halfway between 4 and 6, so Green is 5.



Red 4, Blue 7, Green 5

4 • Pictographs: a picture stands for a number

A **pictograph** uses little pictures instead of bars. The **key** at the bottom tells you what one picture is worth.

Here ★ = 2 apples. Sam has 3 stars, so Sam picked $2 + 2 + 2 = 6$ apples. Ren has 4 stars: **8** apples.



each ★ is worth 2 apples

5 • Half a picture

Here is where fractions sneak in. If ★ = 2, then **half a star** = **half of 2** = 1.

Sam now has 2 stars and a half: **2 + 2 + 1** = **5** apples. Ren has 3 and a half: **2 + 2 + 2 + 1** = **7**.

If the key were ★ = 4, a half star would be **half of 4** = **2**. Always look at the key first!

Apples picked

Sam	★ ★ ★
Jo	★ ★
Ren	★ ★ ★ ★

★ = 2 apples

a half star = half of the key

Stickers collected

Kim	★ ★ ★
Ali	★ ★
Ren	★ ★ ★

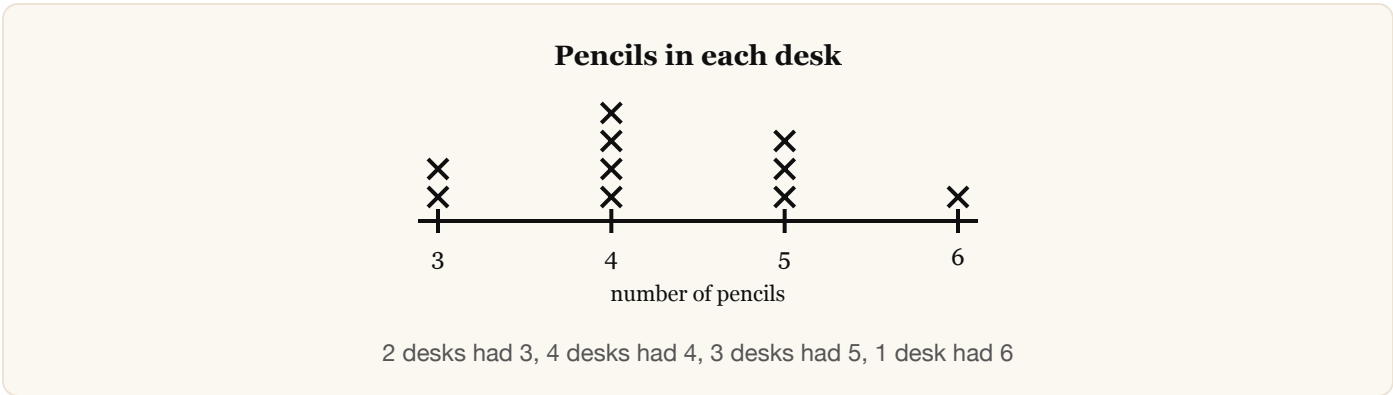
★ = 4 stickers

key = 4, so Ali's half star = 2 (4 ÷ 2 = 2)

6 • Line plots: Xs on a number line

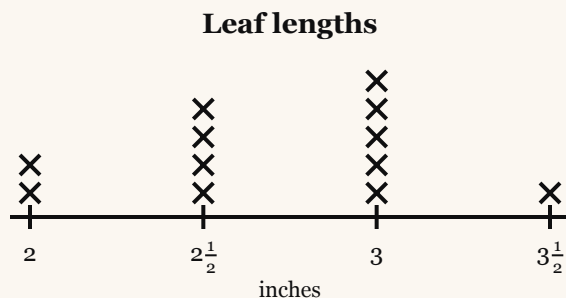
A **line plot** counts how many times each number happens. Every **X** is one thing.

We looked in 10 desks and counted the pencils. Three desks had 5 pencils, so there are **3 Xs above 5**. The most common number is 4 (the tallest stack).



7 • Line plots with halves

When we **measure** things, the answers are often not whole numbers. A leaf can be 2 inches, or $2\frac{1}{2}$ inches. So the number line is marked in **halves**: 2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$. Count the Xs above $2\frac{1}{2}$: **4 leaves** are $2\frac{1}{2}$ inches long.

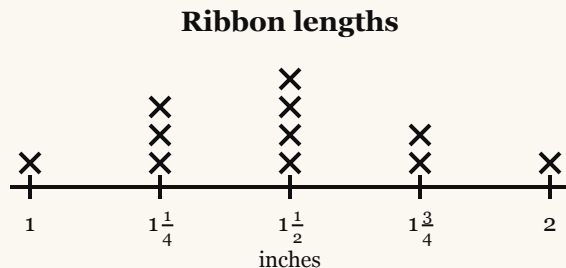


12 leaves measured to the nearest half inch

8 • Line plots with quarters

Measure more carefully and you get **quarters**: 1, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2.

Remember from fractions: **$\frac{2}{4}$ is the same as $\frac{1}{2}$** , so the middle mark can be called $1\frac{1}{2}$ or $1\frac{2}{4}$. The tallest stack shows the most common length: **$1\frac{1}{2}$ inches**.

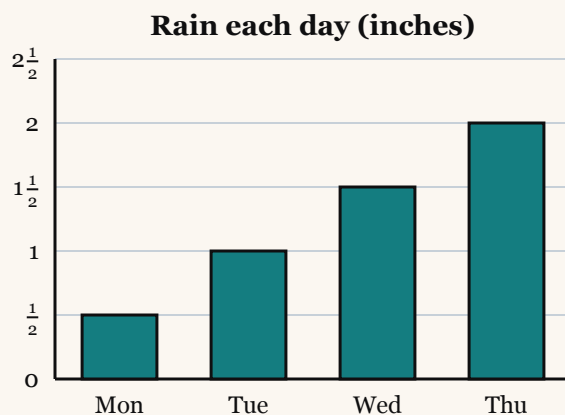


11 ribbons measured to the nearest quarter inch

9 • Bars that stop at a half

Bar graphs can measure too, not just count. This one shows rain. The side numbers count by **halves**: 0, $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2.

Monday's bar stops at $\frac{1}{2}$ **inch**. Wednesday's stops at $1\frac{1}{2}$ **inches**. Slide your finger left, just like before.

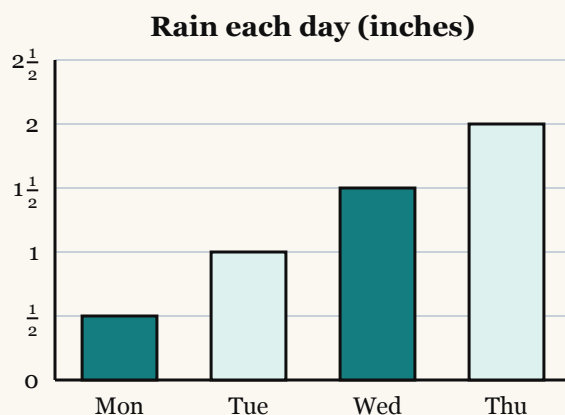


Mon $\frac{1}{2}$, Tue 1, Wed $1\frac{1}{2}$, Thu 2

10 • How many more? Compare two bars

"How many more" means **subtract**, or count the steps from the shorter bar up to the taller one.

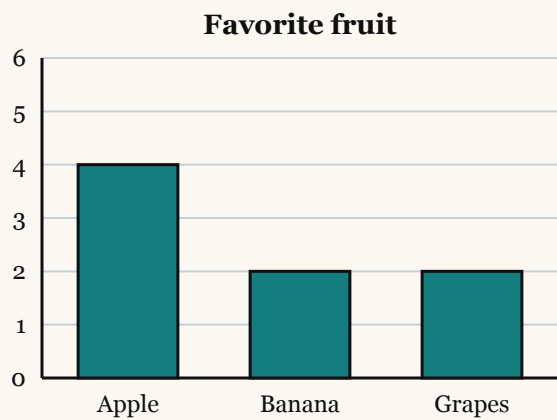
From Monday ($\frac{1}{2}$) up to Wednesday ($1\frac{1}{2}$) is 2 half-steps, and 2 halves make **1 whole**. So Wednesday had 1 inch more rain than Monday.



$$1\frac{1}{2} - \frac{1}{2} = 1 \text{ inch more}$$

11 · What fraction of the whole?

Add all the bars to get the **whole group**: $4 + 2 + 2 = 8$ kids.
Apple was picked by 4 of the 8 kids: $\frac{4}{8}$, which is the same as $\frac{1}{2}$. Banana was picked by 2 of 8: $\frac{2}{8} = \frac{1}{4}$.



8 kids in all: apple $\frac{4}{8} = \frac{1}{2}$, banana $\frac{2}{8} = \frac{1}{4}$

12 · Two steps at once

The hardest questions ask you to do **two things**: read the graph, then add, subtract, or find a fraction.
Sam has $3\frac{1}{2}$ stars and Jo has $2\frac{1}{2}$ stars. With $\star = 2$, that is 7 books and 5 books. How many more did Sam read? $7 - 5 = 2$.

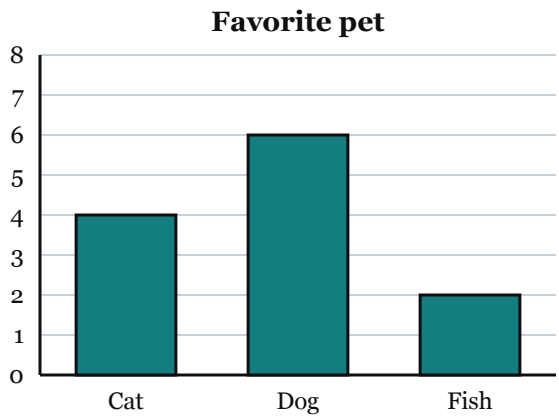
Read the key, read the graph, then do the math. That is the whole trick. 🎉



Sam 7, Jo 5, so 2 more

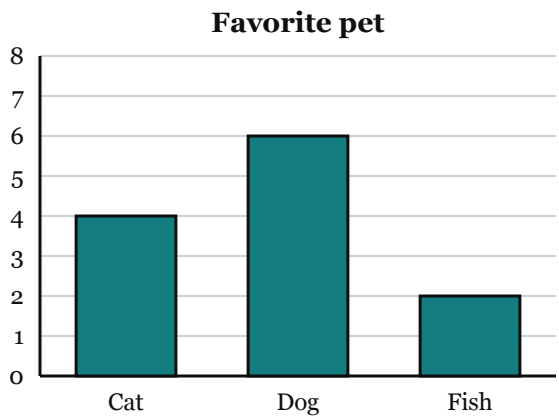
Read each drawing first, then choose the best answer. Take your time, there is no clock here. Questions start gentle and get harder toward the end. Circle your answer.

1 How many kids chose Dog as their favorite pet?



- A** 4
- B** 6
- C** 2
- D** 12

2 Which pet was chosen by the fewest kids?



- A** Cat
- B** Dog
- C** They are all the same
- D** Fish

3 How many books did Mia read?



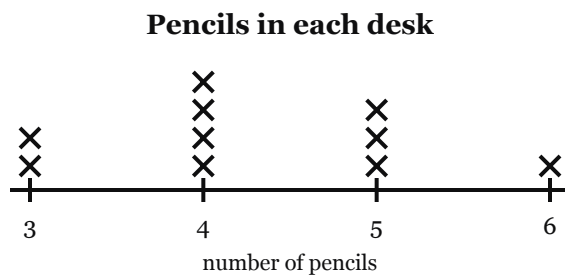
A 6

B 3

C 4

D 8

4 How many desks had exactly 5 pencils?



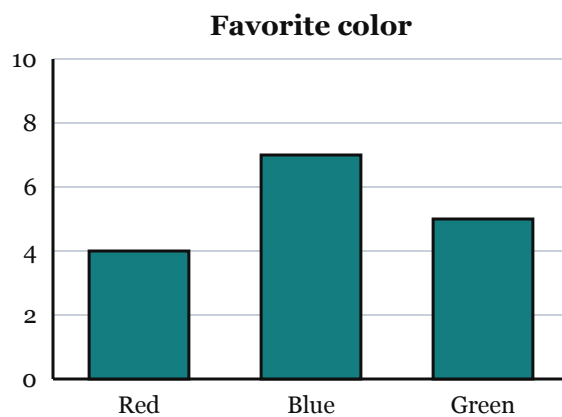
A 5

B 2

C 3

D 4

5 How many kids chose Blue?



A 6

B 8

C 6 1/2

D 7

6 How many books did Leo read?

Books read



A 4

C 6

B 5

D 2 1/2

7 How many stickers does Kim have?

Stickers collected



A 3

C 12

B 6

D 8

8 How many stickers does Ali have?

Stickers collected



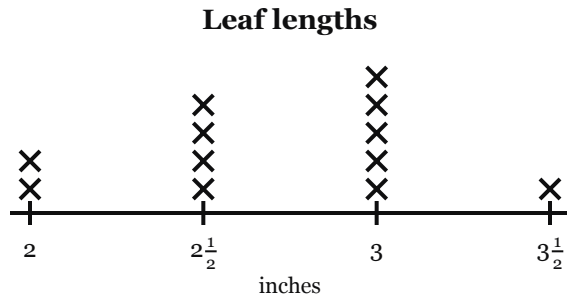
A 6

C 8

B 5

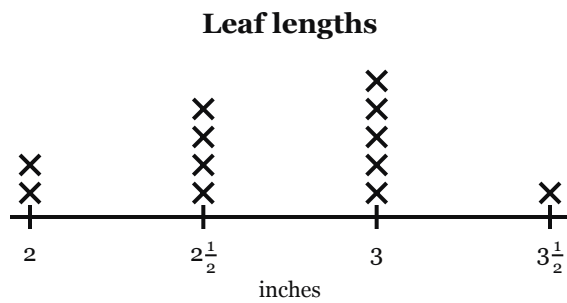
D 2

- 9 How many leaves are $2\frac{1}{2}$ inches long?



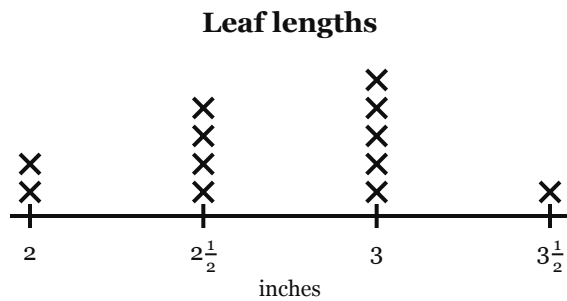
- A 3
C 2
B 4
D 5

- 10 Which leaf length happened most often?



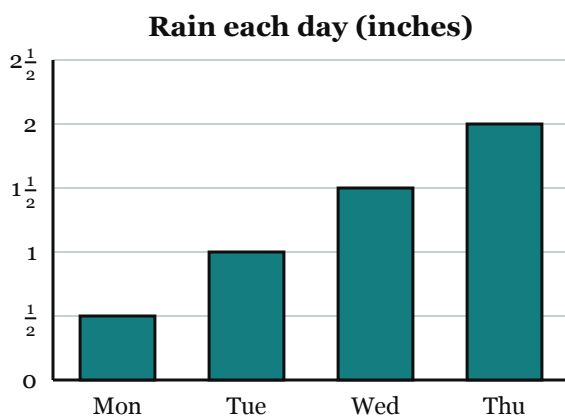
- A $2\frac{1}{2}$ inches
C $3\frac{1}{2}$ inches
B 2 inches
D 3 inches

- 11 How many leaves were measured in all?



- A 12
C 5
B 4
D 11

12 How much rain fell on Wednesday?



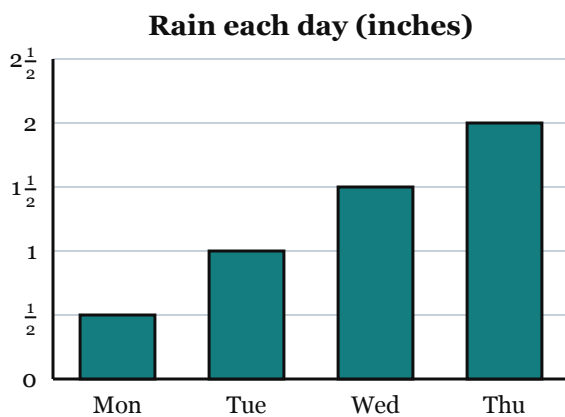
A 1 inch

B 2 inches

C $1\frac{1}{2}$ inches

D $\frac{1}{2}$ inch

13 On which day did exactly $\frac{1}{2}$ inch of rain fall?



A Tuesday

B Wednesday

C Thursday

D Monday

14



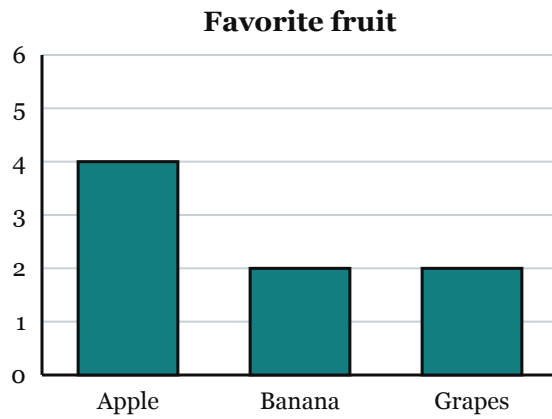
- D 3

15



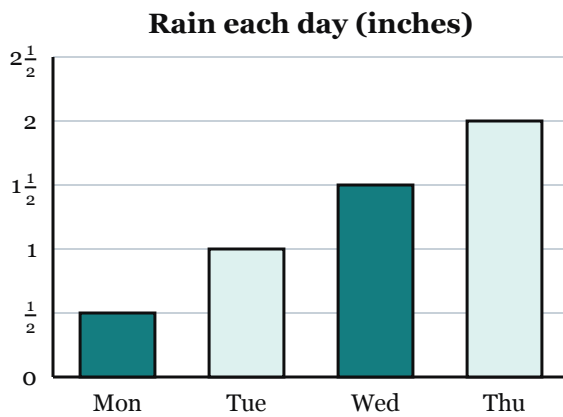
- D** 4/4

- 16 What fraction of the kids chose Banana?



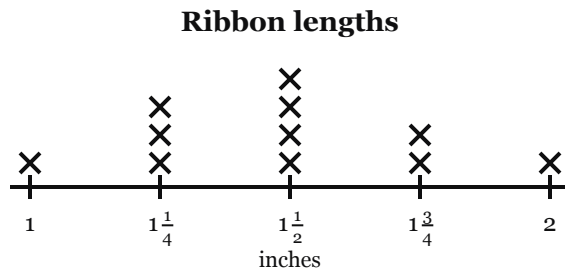
- A $\frac{1}{4}$ B $\frac{1}{2}$
C $\frac{2}{6}$ D $\frac{1}{8}$

- 17 How much more rain fell on Wednesday than on Monday?



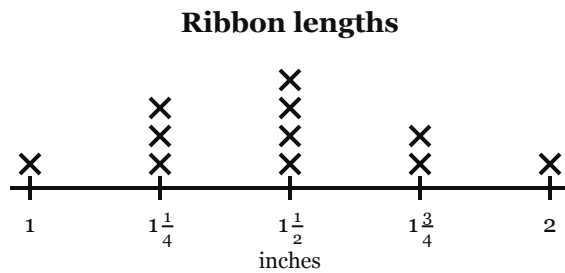
- A $\frac{1}{2}$ inch B 2 inches
C 1 inch D $1\frac{1}{2}$ inches

- 18 How many ribbons are longer than $1\frac{1}{2}$ inches?



- A 4
B 7
C 2
D 3

- 19 How many ribbons measure $1\frac{2}{4}$ inches?



- A 3
B 4
C 2
D 0

- 20 How many more books did Sam read than Jo?



- A 2
B 1
C 12
D $1\frac{1}{2}$

- 21** How many stickers do Kim, Ali, and Ren have all together?

Stickers collected



- A** 28 **B** 7
C 26 **D** 24

- 22** In a pictograph, each ★ stands for 2 stickers. Zoe has 7 stickers. What should Zoe's row look like?

- A** 3 stars
- B** 4 stars
- C** 3 stars and a half star
- D** 7 stars

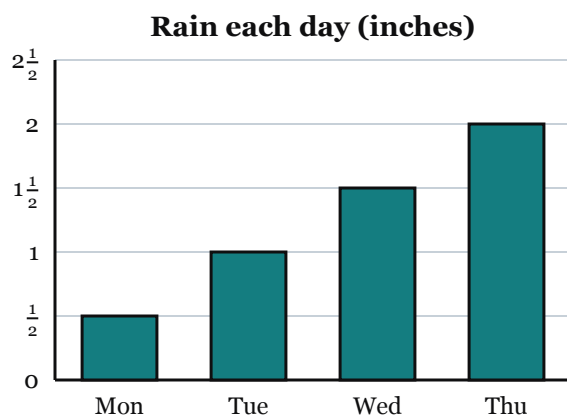
- 23** The key is missing. Tom has 12 marbles. How many marbles does each ★ stand for?

Marbles



- A** 3 **B** 12
C 6 **D** 4

- 24 How much rain fell in all four days together?



A 4 inches

B 5 inches

C $4\frac{1}{2}$ inches

D $5\frac{1}{2}$ inches

ANSWER KEY & EXPLANATIONS

- 1 B** The Dog bar stops at 6 on the side numbers.
- 2 D** The shortest bar is Fish (2 kids).
- 3 A** Mia has 3 stars and each star is worth 2 books: $2 + 2 + 2 = 6$.
- 4 C** Count the Xs above the 5: there are 3.
- 5 D** The side counts by 2s. The Blue bar stops halfway between 6 and 8, which is 7.
- 6 B** Leo has 2 whole stars ($2 + 2 = 4$) and a half star (half of $2 = 1$): $4 + 1 = 5$ books.
- 7 C** Kim has 3 stars and each star is worth 4 stickers: $4 + 4 + 4 = 12$.
- 8 A** One whole star is 4. The half star is half of 4, which is 2. So $4 + 2 = 6$.
- 9 B** Find the $2\frac{1}{2}$ mark and count the Xs above it: 4.
- 10 D** The tallest stack of Xs is above 3, with 5 Xs.
- 11 A** Count every X: $2 + 4 + 5 + 1 = 12$ leaves.
- 12 C** The side numbers count by halves. Wednesday's bar stops at the $1\frac{1}{2}$ line.
- 13 D** Monday's bar is the only one that stops at the $\frac{1}{2}$ line.
- 14 B** Add all the bars: $4 + 2 + 2 = 8$ kids.
- 15 C** 4 of the 8 kids chose Apple. $\frac{4}{8}$ is the same as $\frac{1}{2}$.
- 16 A** 2 of the 8 kids chose Banana. $\frac{2}{8}$ is the same as $\frac{1}{4}$.
- 17 C** Wednesday is $1\frac{1}{2}$ and Monday is $\frac{1}{2}$. From $\frac{1}{2}$ up to $1\frac{1}{2}$ is two half-steps, which is 1 whole inch.
- 18 D** Longer than $1\frac{1}{2}$ means the $1\frac{3}{4}$ mark (2 Xs) and the 2 mark (1 X): $2 + 1 = 3$ ribbons.
- 19 B** $\frac{2}{4}$ is the same as $\frac{1}{2}$, so look above the $1\frac{1}{2}$ mark: 4 Xs.
- 20 A** Sam: 3 stars and a half = $2 + 2 + 2 + 1 = 7$. Jo: 2 stars and a half = $2 + 2 + 1 = 5$. $7 - 5 = 2$.
- 21 A** Kim 12, Ali 6, Ren 10 (two stars = 8, plus a half star = 2). $12 + 6 + 10 = 28$.
- 22 C** 3 stars = 6 stickers. One more sticker is half of a star, so 3 stars and a half star = 7.
- 23 D** Tom has 3 stars for 12 marbles. $3 \times 4 = 12$, so each star is 4 marbles.
- 24 B** $\frac{1}{2} + 1 + 1\frac{1}{2} + 2$. The two halves make 1, so $1 + 1 + 1 + 2 = 5$ inches.