SIGMABUDGIE · GRADE 3

Area & Perimeter

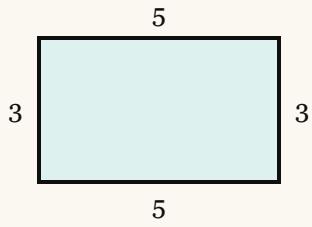
A gentle walkthrough & a 24-question exam

Part 1 walks through perimeter and area 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 · Perimeter: the walk around the edge

Imagine an ant walking all the way around a shape and coming back to where it started. The distance it walks is the **perimeter**.

To find it, **add up every side**. This rectangle is 5 long and 3 tall: **5 + 3 + 5 + 3 = 16**. The ant walks 16 units.

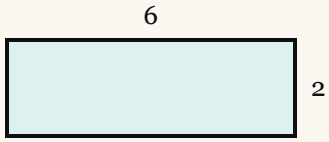


perimeter = 5 + 3 + 5 + 3 = 16 units

2 · Every side counts, even the ones with no number

A rectangle has 4 sides, and **opposite sides are the same length**. If you only see two numbers, the other two sides match them.

This rectangle shows 6 and 2. The hidden sides are also 6 and 2. Perimeter: **6 + 2 + 6 + 2 = 16**.

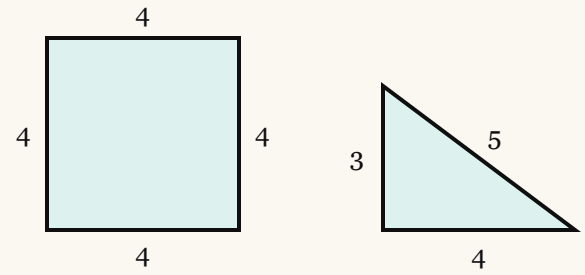


only two labels, but four sides: 6 + 2 + 6 + 2 = 16

3 · Squares, triangles, and any shape at all

A **square** has 4 sides that are all the same. Side 4 means **4 + 4 + 4 + 4 = 16**, or 4 × 4 = 16.

Perimeter works for **any** shape. A triangle with sides 3, 4, and 5 has perimeter **3 + 4 + 5 = 12**. Just add every side once.

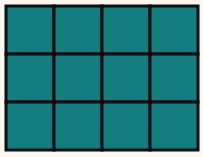


square: 4 + 4 + 4 + 4 = 16 triangle: 3 + 4 + 5 = 12

4 · Area: how many squares fit inside

Area is how much space is **inside** a shape. We measure it by counting the **unit squares** that cover it.

Count the squares in this rectangle: **12**. Its area is 12 **square units**.

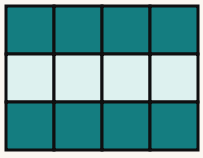


count them: 12 square units

5 · Count by rows

Counting one square at a time is slow. Count a **row** instead, then count how many rows.

Each row has 4 squares, and there are 3 rows: **4 + 4 + 4 = 12**. That is the same as **3 × 4 = 12**.

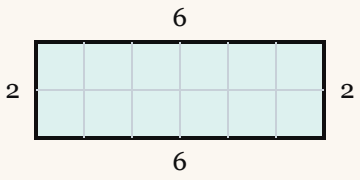


3 rows of 4 = 3 × 4 = 12

6 · Area = length × width

For any rectangle, **area = length × width**. No grid needed, just the two numbers.

This rectangle is 6 long and 2 wide: **6 × 2 = 12 square units**. The faint lines show the 12 squares hiding inside.



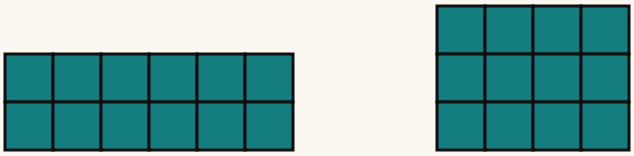
area = 6 × 2 = 12 square units

7 · Same area, different perimeter

These three rectangles all have area **12**: 1 × 12, 2 × 6, and 3 × 4.

But their perimeters are different: **26**, **16**, and **14**. The long skinny one has the longest walk around. Area and perimeter are two different things!

1 × 12: area 12, perimeter 26



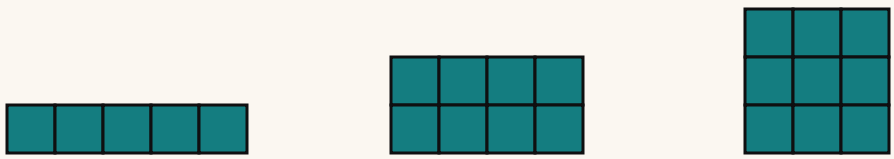
2 × 6: area 12, perimeter 16

3 × 4: area 12, perimeter 14

8 · Same perimeter, different area

Now the other way around. These rectangles all have perimeter **12**.

1 × 5 holds **5** squares, 2 × 4 holds **8**, and 3 × 3 holds **9**. Same fence, different amount of garden inside.

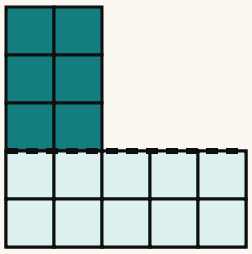


1 × 5: perimeter 12, area 5 2 × 4: perimeter 12, area 8 3 × 3: perimeter 12, area 9

9 · Odd shapes: cut them into rectangles

This L shape is not a rectangle, but you can **cut it into two** rectangles along the dotted line.

The bottom part is 5 × 2 = **10**. The top part is 2 × 3 = **6**. Add them: **10 + 6 = 16 square units**. (Or just count the squares!)

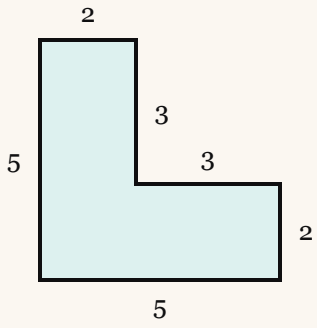


10 + 6 = 16 square units

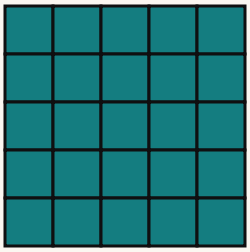
10 · Perimeter of odd shapes

For perimeter, the ant still walks every edge. Go around the L and add: **5 + 2 + 3 + 3 + 2 + 5 = 20**.

Fun fact: a 5 × 5 square also has perimeter 20, but its area is 25, and the L only has 16. The notch cut out some area without changing the walk around.



perimeter = 5 + 2 + 3 + 3 + 2 + 5 = 20



5 × 5 square: perimeter 20, area 25

11 · Units and square units

Perimeter is a **length**, so it uses plain units: inches, feet, centimeters. "The fence is 20 feet."

Area counts **squares**, so it uses square units: square inches, square feet, square centimeters. "The rug covers 20 square feet."

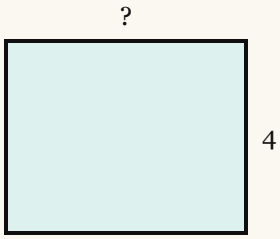
a unit measures length; a square unit measures area

12 · Working backwards

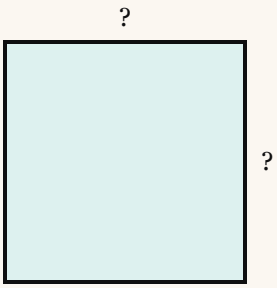
Sometimes you know the answer and need a missing side.

A rectangle has area **20** and one side is **4**. What is the other side? Think: 4 × ? = 20, so ? = **5**.

A square has perimeter **20**. All 4 sides are equal, so each side is 20 ÷ 4 = **5**. You are ready for the test! 🎉



area 20, side 4, so the missing side is 5



square with perimeter 20: each side is 5

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 What is the area of this shape?

A 5 square units

B 10 square units

C 6 square units

D 3 square units

2 What is the perimeter of this rectangle?

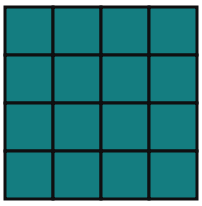
A 12 units

B 8 units

C 6 units

D 16 units

3 What is the area of this square?



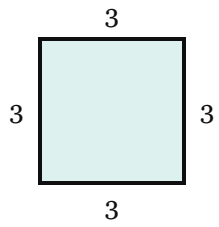
A 8 square units

B 4 square units

C 12 square units

D 16 square units

4 What is the perimeter of this square?



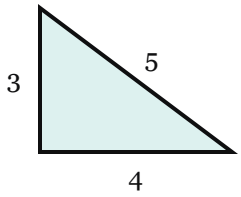
A 9 units

B 12 units

C 6 units

D 3 units

5 What is the perimeter of this triangle?



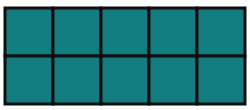
A 12 units

B 7 units

C 60 units

D 9 units

6 What is the area of this shape?



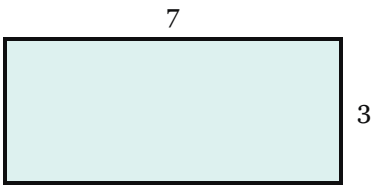
A 7 square units

B 14 square units

C 10 square units

D 5 square units

7 Only two sides are labeled. What is the perimeter of this rectangle?



A 10 units

B 20 units

C 21 units

D 17 units

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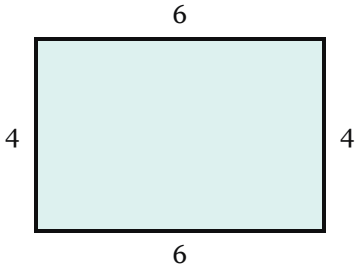
8 What is the area of this rectangle?



A 20 square units

B 10 square units

C 12 square units

D 24 square units

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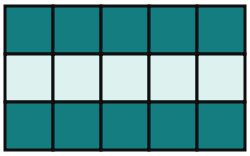
9 Which number sentence gives the area of this shape?



A 3×5

B $3 + 5$

C $3 + 5 + 3 + 5$

D 5×5

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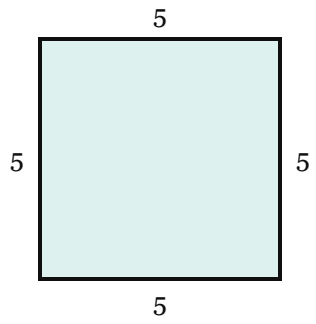
10 What is the area of this square?



A 20 square units

B 10 square units

C 25 square units

D 5 square units

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11 What is the perimeter of this rectangle?

A 16 units

B 10 units

C 18 units

D 20 units

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12 What is the area of the same rectangle?

A 20 square units

B 16 square units

C 10 square units

D 8 square units

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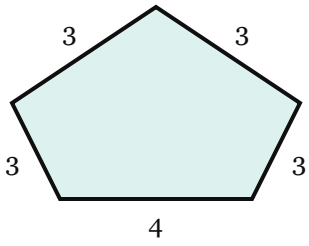
13 What is the perimeter of this shape?



A 12 units

B 16 units

C 15 units

D 20 units

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14 A rug is 5 feet long and 4 feet wide. How much floor does it cover?

A 18 square feet

B 9 square feet

C 20 feet

D 20 square feet

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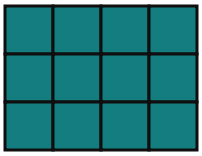
15 Look at shapes A and B. Which is true about their areas?

A

B



A A has a bigger area

B B has a bigger area

C They have the same area

D You cannot tell

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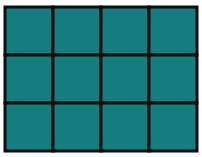
16 Look at shapes A and B again. Which has the bigger perimeter?

A

B



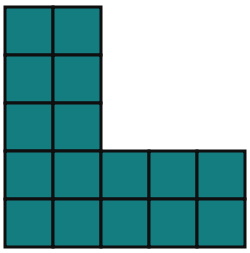
A A

B B

C They are the same

D You cannot tell

17 What is the area of this L shape?



A 25 square units

B 20 square units

C 10 square units

D 16 square units

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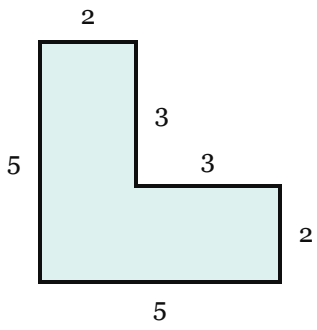
18 What is the perimeter of this L shape?



A 20 units

B 16 units

C 25 units

D 18 units

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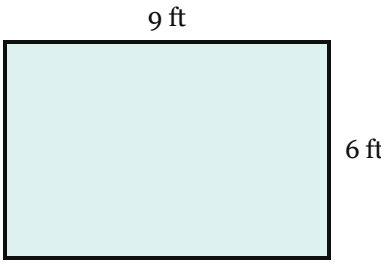
19 A garden is 9 feet long and 6 feet wide. How much fence is needed to go all the way around it?



A 54 feet

B 30 feet

C 15 feet

D 30 square feet

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20 This rectangle has an area of 18 square units. One side is 3. How long is the missing side?

A 15

B 9

C 6

D 21

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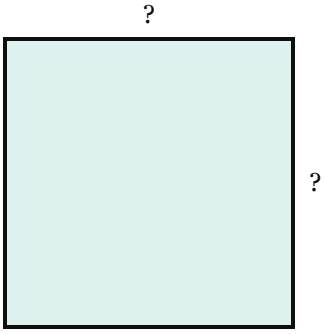
21 The perimeter of this square is 24 units. How long is each side?



A 6

B 12

C 4

D 20

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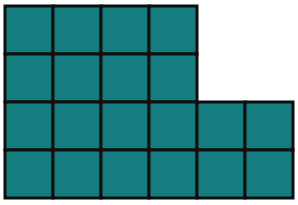
22 A corner was cut out of this rectangle. What is the area of the shape that is left?



A 24 square units

B 20 square units

C 22 square units

D 16 square units

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23 Which rectangle has an area of 12 square units AND a perimeter of 14 units?

A 2 by 6

B 1 by 12

C 3 by 4

D 4 by 4

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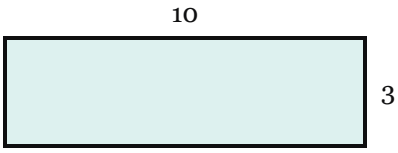
24 A rectangle is 10 units long and 3 units wide. Mia says its perimeter is 13. Ben says 26. Ava says 30. Who is right?



A Mia

B Ava

C Nobody

D Ben

ANSWER KEY & EXPLANATIONS

1	**C**	Count the squares: 2 rows of 3 = 6 square units.
2	**A**	Add all four sides: 4 + 2 + 4 + 2 = 12.
3	**D**	4 rows of 4 squares: 4 × 4 = 16 square units.
4	**B**	A square has 4 equal sides: 3 + 3 + 3 + 3 = 12.
5	**A**	Add the three sides: 3 + 4 + 5 = 12.
6	**C**	2 rows of 5 = 10 square units.
7	**B**	Opposite sides match, so the sides are 7, 3, 7, 3. 7 + 3 + 7 + 3 = 20.
8	**D**	Area = length × width = 6 × 4 = 24 square units.
9	**A**	There are 3 rows with 5 squares in each row: 3 × 5 = 15 square units.
10	**C**	5 × 5 = 25 square units. (20 is the perimeter, not the area.)
11	**D**	8 + 2 + 8 + 2 = 20.
12	**B**	8 × 2 = 16 square units.
13	**B**	Add every side: 4 + 3 + 3 + 3 + 3 = 16.
14	**D**	Covering the floor is area: 5 × 4 = 20. Area uses square units, so 20 square feet.
15	**C**	A is 2 × 6 = 12 and B is 3 × 4 = 12. Same area.
16	**A**	A: 6 + 2 + 6 + 2 = 16. B: 4 + 3 + 4 + 3 = 14. A has the bigger perimeter.
17	**D**	Cut it into two rectangles: 5 × 2 = 10 and 2 × 3 = 6. 10 + 6 = 16 square units. Or count all 16 squares.
18	**A**	Walk around every side: 5 + 2 + 3 + 3 + 2 + 5 = 20.
19	**B**	Going around is perimeter: 9 + 6 + 9 + 6 = 30 feet. (54 is the area.)
20	**C**	3 × ? = 18, so the missing side is 18 ÷ 3 = 6.
21	**A**	A square has 4 equal sides: 24 ÷ 4 = 6.
22	**B**	The full rectangle would be 6 × 4 = 24. The missing corner is 2 × 2 = 4. 24 − 4 = 20 square units.
23	**C**	3 × 4 = 12 and 3 + 4 + 3 + 4 = 14. (2 by 6 has area 12 but perimeter 16.)
24	**D**	Perimeter = 10 + 3 + 10 + 3 = 26, so Ben is right. Mia only added two sides. Ava found the area (10 × 3 = 30).