Area and Perimeter of Rectangles

Apply the skill to decisions and designs

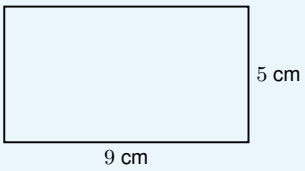
Name _____ **Date** _____ **Score** _____ / 8

QUICK REVIEW

For a rectangle, area $A = l \times w$ counts square units; perimeter $P = 2(l + w)$ measures the boundary. A 7-cm by 4-cm rectangle has $A = 28$ cm^2 and $P = 22$ cm. Do not mix square units and length units.

Worked example

Find the area and perimeter of this rectangle.



1. The area counts 5 rows of 9 unit squares: $9 \times 5 = 45$.

2. The boundary uses two of each side: $9 + 5 + 9 + 5 = 28$.

3. Check: area $45 \div 9 = 5$ rows; half the perimeter is $28 \div 2 = 14 = 9 + 5$.

Answer: Area 45 cm^2; perimeter 28 cm.

Practice Problems

Show your thinking.

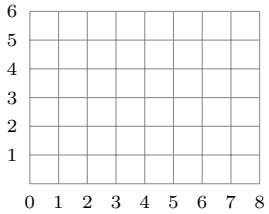
1. A 10-m by 6-m garden needs fencing, except for a 3-m gate. Choose the smallest roll that works: 27, 29, or 32 m.

2. Two garden designs must use at most 20 m of edging and cover at least 23 m^2. Design A is 7 m by 3 m; B is 6 m by 4 m. Which qualifies?

3. A 9-m by 4-m floor will use 2-m by 2-m square tiles in straight rows with edges parallel to the walls. No tile may be cut. Find the most whole tiles that fit and the area left.

4. A 40-cm by 30-cm poster needs a 2-cm margin on all four sides. A student subtracts 2 only once from each side length. Find the true printing area.

5. Draw a rectangle with whole-number sides, perimeter 18 grid units, and area 20 square grid units.



6. Join two identical 8-cm by 3-cm mats along one full side, without overlap. Which join uses less trim around the outside: along the long sides or along the short sides? By how much?

7. A sign must cover 35 cm^2. Both sides must be whole centimeters, at least 3 cm and no longer than 7 cm. Find the only side lengths that work and the trim needed.

8. A 9-m by 6-m room has a 3-m by 2-m rug. Find the uncovered area.

Answer Key

1. 29-m roll.
2. Only B: 20 m around and 24 m^2.
3. 8 whole tiles; 4 m^2 left.
4. 936 cm^2.
5. A 5-by-4 rectangle.
6. Join long sides; 10 cm less trim.
7. 5 cm by 7 cm; 24 cm of trim.
8. 48 m^2.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The full boundary is $10 + 6 + 10 + 6 = 32$ m.

2. Leave out the gate: $32 - 3 = 29$ m must be fenced.

3. 27 m is too short; 29 m fits exactly and is smaller than 32 m.

Problem 2

1. A: $2(7 + 3) = 20$ m around and $7 \times 3 = 21$ m^2.

2. B: $2(6 + 4) = 20$ m around and $6 \times 4 = 24$ m^2.

3. Both fit the edging limit, but only $24 \geq 23$ meets the area minimum.

Problem 3

1. Along 9 m, four 2-m sides fit (8 m) with 1 m left. Along 4 m, exactly two fit.

2. Use $4 \times 2 = 8$ whole tiles; the last strip is too narrow for another.

3. The uncovered strip is 1 m by 4 m, so its area is $1 \times 4 = 4$ m^2.

Problem 4

1. Two margins reduce each dimension by $2 + 2 = 4$ cm.

2. Printable length $40 - 4 = 36$ cm; printable width $30 - 4 = 26$ cm.

3. $36 \times 26 = 720 + 216 = 936$ cm^2.

Problem 5

1. Half the perimeter is $18 \div 2 = 9$, so the sides sum to 9.

2. Unordered pairs $1, 8$; $2, 7$; $3, 6$; and $4, 5$ give areas $8, 14, 18, 20$.

3. Outline 5 grid steps by 4 grid steps. Only that pair covers 20 and goes 18 units around.

Problem 6

1. Long sides meet: the outside is 8 cm by 6 cm, with perimeter $2(8 + 6) = 28$ cm.

2. Short sides meet: the outside is 16 cm by 3 cm, with perimeter $2(16 + 3) = 38$ cm.

3. $38 - 28 = 10$ cm less trim when the long shared edges are inside.

Problem 7

1. Whole-number factor pairs of 35 are 1×35 and 5×7.

2. 1 is too short and 35 is too long. Both 5 and 7 satisfy the limits.

3. Add the four sides: $5 + 7 + 5 + 7 = 24$ cm of trim.

Problem 8

1. Room area: $9 \times 6 = 54$ m^2.

2. Rug area: $3 \times 2 = 6$ m^2.

3. $54 - 6 = 48$ m^2 uncovered.

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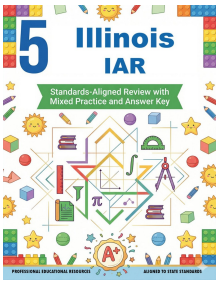

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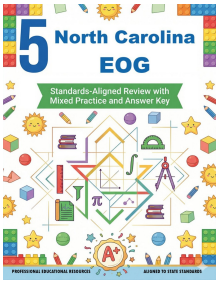

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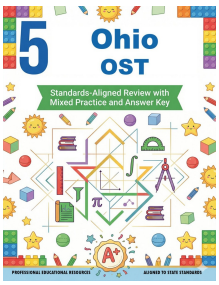

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