Covering Shapes with Unit Squares

Apply the skill to decisions and designs

Name _____ **Date** _____ **Score** _____ / 6

QUICK REVIEW

A complete cover leaves no gaps and puts no two tiles on top of each other. Each tile covers 1 square unit. Find how many cells the whole shape has, then subtract the cells already covered. Stacking tiles does not cover extra surface.

Worked example

The shaded cells each have one unit-square tile. How many more tiles finish the cover without gaps or overlaps?

1. The surface has $4 \times 1 = 4$ unit-square spaces; 2 are already covered.

2. Cover every empty space once: $4 - 2 = 2$ additional tiles.

Answer: 2 more tiles.

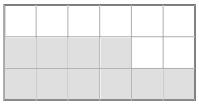


Shaded = one covering tile

Practice Problems

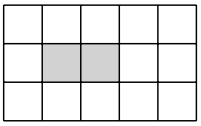
Show your thinking.

1. Finish covering this mat. Each shaded cell already has one tile. New tiles come in pairs. How many pairs are needed?



Shaded = one covering tile

2. Tile the open part of the patio. Leave the two gray drain cells uncovered. How many tiles are needed?



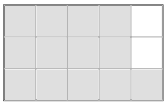
Gray cells are drains

3. A mat has 20 spaces and 6 are covered. Which order covers it with no extra tiles: three packs of 4, two packs of 6, or two packs of 4 and one pack of 6?

4. Join two 3-by-3 mats along one whole edge, without overlap. A student adds an extra row for the shared edge. How many tiles actually cover the joined mats?

5. You have 14 tiles. Cover a 4-by-3 mat first, then use every spare tile on a 3-by-2 mat. How many spaces on the second mat stay empty?

6. The three shaded strips each cover one row of a mat. Are the rows complete? If not, explain where to add tiles.



Shaded = one covering tile

Answer Key

1. 4 pairs.
2. 13 tiles.
3. Two packs of 4 and one of 6.
4. 18 tiles; the shared edge needs no extra row.
5. 4 empty spaces.
6. Add one tile at the right end of each of the two shorter rows.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Count the shaded cells: $6 + 4 = 10$. The whole mat has $6 \times 3 = 18$ spaces.

2. The gap is $18 - 10 = 8$ spaces, so buy $8 \div 2 = 4$ pairs.

Problem 2

1. The patio has 5 cells in each of 3 rows: $5 \times 3 = 15$ spaces.

2. Skip the two drains. Cover the other $15 - 2 = 13$ cells with one tile each.

Problem 3

1. Find the shortage: $20 - 6 = 14$ tiles.

2. The first two orders each give 12. The mixed order gives $4 + 4 + 6 = 14$, exactly enough.

Problem 4

1. Each mat has $3 \times 3 = 9$ unit-square spaces.

2. The shared edge is a boundary, not another row of spaces. Cover $9 + 9 = 18$ spaces once each.

Problem 5

1. The first mat takes $4 \times 3 = 12$ tiles, so $14 - 12 = 2$ tiles are spare.

2. The second mat has $3 \times 2 = 6$ spaces. Two are covered, leaving $6 - 2 = 4$ empty.

Problem 6

1. The bottom row already covers all 5 cells. The other rows each cover 4 of their 5 cells.

2. Each short row needs $5 - 4 = 1$ more tile. That is $1 + 1 = 2$ new tiles, filling every space.

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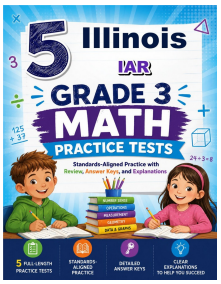

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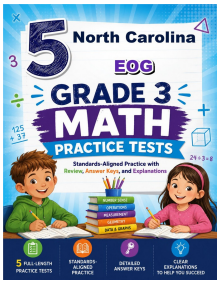

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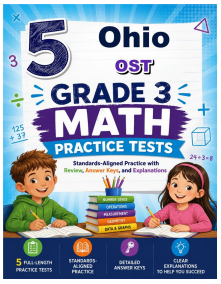

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