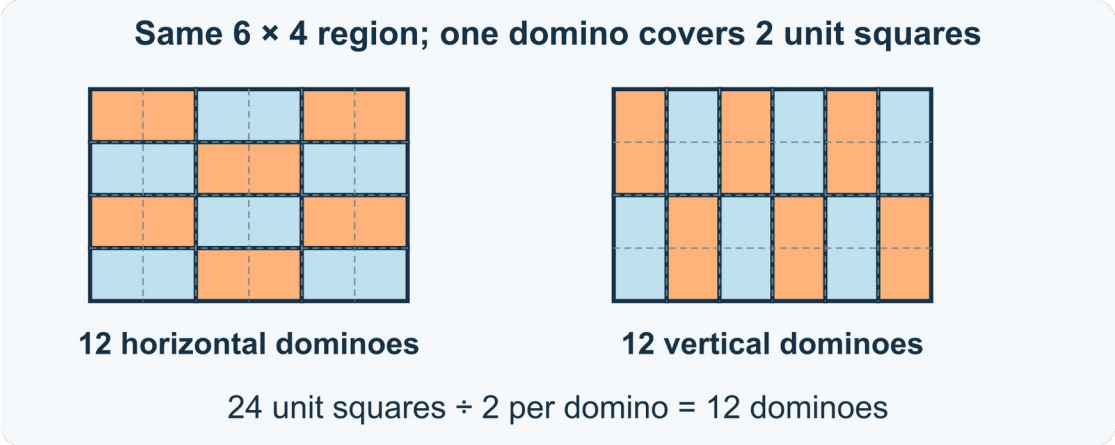
A tiling pattern with a rule

How can a repeated shape cover a region without gaps or overlaps?

Cover a small drawn region with repeated two-square tiles, then explain why a count alone is not a complete proof.

Make | 15–25 minutes, or one row | Paper and a pencil or pen, Optional squared paper or ruler; a rough labelled grid is enough

Start here Draw a rectangle with 6 equal columns and 4 equal rows. One little square is one unit of area. Your tile is a domino covering two neighbouring squares.



Two arrangements, the same covered region

1 State the rule

Use whole dominoes only. Each must cover exactly two side-by-side unit squares. Tiles may turn, but cannot overlap, cross the boundary or leave gaps.

2 Make a complete arrangement

Draw three horizontal dominoes across each row. Repeat that row four times. Trace the outline of each tile so the unit grid does not hide where one tile ends.

3 Check placement and count

Check every one of the 24 unit squares belongs to exactly one tile. Four rows with three dominoes give 12 tiles; 12 × 2 = 24 unit squares.

4 Try another arrangement

Turn all dominoes vertically. Each column now has two dominoes, and six columns still use 12. Describe the changed placement and unchanged coverage, or keep just the first arrangement.

Constructed example two ways to cover 24 squares

These are original drawn arrangements, not a record of a real tiled floor.

• Horizontal: 3 dominoes per row × 4 rows = 12 dominoes.

• Vertical: 2 dominoes per column × 6 columns = 12 dominoes.

• Both cover 12 × 2 = 24 unit squares without cutting tiles. The drawn placement, as well as the area count, checks this region.

What this example can show Matching total area is necessary here, but does not by itself prove that any other board can be tiled. The shape and placement also matter.

A different way

Use the supplied arrangement and point to one row, dictate where a tile goes, or trace only a 2-by-2 corner. No cutting or coloured pens are needed.

If you want to go further

Cross out just one unit square on a copy. There are now 23 squares. Explain why whole two-square dominoes cannot cover an odd number of squares; do not claim this rules out every other altered board.

Something to notice

Did I check the actual placement as well as the total area?

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