

Painted cube — Up to 8 on each edge

Name: _____

Date: _____



A block is painted all over, then cut into little cubes. Count the ones the question asks for, and show why.

- 1 A solid wooden block, 3 cubes long on every side, is painted red all over its outside and then sawn into $3 \times 3 \times 3$ little cubes.

How many of the little cubes have paint on exactly two faces?

Why

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- 2 A solid wooden block, 6 cubes long on every side, is painted red all over its outside and then sawn into $6 \times 6 \times 6$ little cubes.

How many of the little cubes have no paint on them at all?

Why

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Painted cube — Up to 8 on each edge

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A block is painted all over, then cut into little cubes. Count the ones the question asks for, and show why.

- 3 A solid wooden block, 8 cubes long on every side, is painted red all over its outside and then sawn into $8 \times 8 \times 8$ little cubes.

How many of the little cubes have paint on exactly one face?

Why

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- 4 A solid wooden block, 7 cubes long on every side, is painted red all over its outside and then sawn into $7 \times 7 \times 7$ little cubes.

How many of the little cubes have paint on exactly three faces?

Why

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Painted cube · Up to 8 on each edge — Answer key

If they are stuck

- Where must a little cube sit to touch that many faces? Peel the painted shell off and look at what is left.

1. Two painted faces means a cube along an edge, between the two corners. Taking the corners off each edge leaves 1 along it, and a cube has 12 edges: $12 \times 1 = 12$.

3. One painted face means a cube in the middle of a face, off every edge. Each face's middle is $6 \times 6 = 36$, and a cube has 6 faces: $6 \times 36 = 216$.

2. No paint at all means a cube deep inside, never on the surface. Peel one layer off all six sides and the cube left inside is 4 on each edge: $4 \times 4 = 16$, then $16 \times 4 = 64$ cubes hidden in the middle.

4. Three painted faces means a corner, where three sides meet. A cube has 8 corners no matter how big it is, so the answer is 8 — the size of the block never enters into it.

