Off-Grid Cabin Drawing: Solar Panel and Water Features

Original tasks 1, 2, 3 / complete keys

Task 1

A cabin front is 5 units wide and 3 units tall. The roof peak is 2 units above the wall top. Using 1 unit = 3 cm, state the paper width, paper wall height, and total height to the peak.

Answer: Paper width = 15 cm; paper wall height = 9 cm; total height to peak = 15 cm.

Reason: Multiply each unit value by 3 cm: 5 × 3 = 15, 3 × 3 = 9, and (3 + 2) × 3 = 15.

Check: Measure the drawn rectangle and peak with a ruler; confirm 15 cm width, 9 cm wall height, and 15 cm total height.

Task 2

A door is 1 unit wide on a cabin front that is 4 units wide. What fraction of the front width is the door, and what is the door width on paper if 1 unit = 2.5 cm?

Answer: The door is one quarter of the front width, and its paper width is 2.5 cm.

Reason: 1 ÷ 4 = 0.25, so the door is one quarter. Then 1 × 2.5 = 2.5 cm.

Check: Measure the door and front wall; the door should be one quarter of the front width and 2.5 cm wide.

Task 3

A solar panel is drawn on a roof slope that is 6 units long. The panel occupies 3 units of that slope. What fraction of the slope does the panel occupy, and what is the remaining margin in units?

Answer: The panel occupies one half of the slope, and the remaining margin is 3 units total.

Reason: 3 ÷ 6 = 0.5, so one half. The remaining length is 6 − 3 = 3 units, which can be split as an even margin at both ends.

Check: Measure the slope and the panel; the panel should be half the slope length, with equal margins at both ends summing to 3 units.

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Original tasks 4 / complete keys

Task 4

A rain barrel is placed 1.5 units from the cabin wall, and a cistern is placed 1.5 units from the wall on the other side. If 1 unit = 2 cm, what is each gap on paper, and what is the total gap width across both sides?

Answer: Each gap is 3 cm on paper, and the total gap width across both sides is 6 cm.

Reason: 1.5 × 2 = 3 cm per gap; two gaps give 3 + 3 = 6 cm.

Check: Measure each gap with a ruler; both should be 3 cm, and their sum should be 6 cm.

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Source rubric / reflection

- [ ] Cabin front is a rectangle on the baseline with a centered roof peak on the midline.
- [ ] Left and right roof slopes are equal in length within the stated unit check.
- [ ] Solar panel is tilted parallel to a roof slope, smaller than the slope, and labeled.
- [ ] At least one water feature is drawn at ground level, connected or adjacent to the cabin, and labeled.
- [ ] Lowercase labels reach the midline; letter style may vary.
- [ ] Proportions are checked with arithmetic in consistent units and the scale is written on the page.

Reflection: What did you check, what did you change, and what will you try next?