Draw a Porch: Railing Spacing and Step Depth

Original tasks 1, 2, 3, 4 / complete keys

Task 1

A porch is 3.6 m wide. Use 1 cm = 20 cm and target post spacing of 1.2 m. How many gaps and posts should you draw, and what is the paper spacing?

Answer: 3 gaps and 4 posts; paper spacing is 6 cm.

Reason: 3.6 m divided by 1.2 m equals 3 gaps. Add one for 4 posts. 1.2 m becomes 6 cm at the stated scale.

Check: Multiply gaps by spacing: 3 times 1.2 m equals 3.6 m, matching the porch width.

Task 2

Draw 5 steps with 25 cm tread and 18 cm rise. What are the total run and total rise in centimeters?

Answer: Total run 125 cm; total rise 90 cm.

Reason: Total run equals 5 times 25 cm equals 125 cm. Total rise equals 5 times 18 cm equals 90 cm.

Check: Divide total run by 5 to recover 25 cm; divide total rise by 5 to recover 18 cm.

Task 3

At 1 cm = 20 cm, a step tread of 40 cm and rise of 20 cm become what paper lengths?

Answer: Tread 2 cm; rise 1 cm.

Reason: Divide each real length by 20: 40 divided by 20 equals 2; 20 divided by 20 equals 1.

Check: Multiply paper lengths by 20: 2 cm times 20 equals 40 cm; 1 cm times 20 equals 20 cm.

Task 4

A porch is 5 m wide with 4 equal gaps. What is the spacing in meters and in paper centimeters at 1 cm = 20 cm?

Answer: Spacing 1.25 m; paper spacing 6.25 cm.

Reason: 5 m divided by 4 gaps equals 1.25 m per gap. Divide 1.25 m by 20 cm per paper cm: 125 cm divided by 20 equals 6.25 cm.

Check: Multiply 4 gaps by 1.25 m to get 5 m; multiply 6.25 cm by 20 to get 125 cm.

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Source rubric / reflection

- [ ] Porch width and scale are labeled and consistent.
- [ ] Railing posts are equal width and evenly spaced within a small tolerance.
- [ ] Top and bottom rails connect all posts.
- [ ] Step tread and rise are equal for every step.
- [ ] Total run and total rise are labeled and arithmetically correct.
- [ ] Lettering follows the lettering baseline-to-x-height-line convention; style may vary.
- [ ] Drawing stays within the porch boundary and excludes full facades, roofs, and interiors.

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