Pencil Building Sketch: Construction Lines and Proportion

Original tasks 1, 2, 3 / complete keys

Task 1

A building sketch has a wall height of 10 units and a roof rise of 5 units. The width is 6 units. Calculate the total height, the simplified width-to-height ratio, and the roof fraction of total height.

Answer: Total height = 10 + 5 = 15 units. Width-to-height ratio = 6:15, which simplifies to 2:5. Roof fraction = 5/15 = 1/3 of total height.

Reason: Add wall and roof heights for total height. Write width to total height as a ratio and divide both numbers by their greatest common divisor, 3. Divide roof rise by total height and simplify.

Check: Reverse the ratio: 2:5 means for every 2 width units there are 5 height units. Multiply 2 and 5 by 3 to recover 6:15. Check that 1/3 of 15 is 5.

Task 2

A sketch uses baseline-to-midline convention. The building height is 16 units and a sign is 4 units from baseline to midline. What fraction of the building height is the sign? If the sign were moved so it measured 8 units, what fraction would it be?

Answer: At 4 units, the sign is 4/16 = 1/4 of the building height. At 8 units, it is 8/16 = 1/2 of the building height.

Reason: Divide the feature height by the building height and simplify. The convention is stated, so the comparison is valid.

Check: Multiply the fraction by the building height: 1/4 of 16 is 4, and 1/2 of 16 is 8.

Task 3

A building is 12 units wide and 18 units high. A second sketch of the same building is 8 units wide. Using the same width-to-height ratio, what should the second sketch's height be?

Answer: The first ratio is 12:18, which simplifies to 2:3. For a width of 8 units, solve 8/h = 2/3, so h = 12 units.

Reason: Simplify the first ratio. Set up a proportion with the new width and solve for height. Cross-check by simplifying 8:12 to 2:3.

Check: Divide 8 by 2 and multiply by 3 to get 12. Confirm that 8:12 simplifies to 2:3.

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Original tasks 4 / complete keys

Task 4

A sketch has a total height of 20 units. The roof is 5 units high. The width is 10 units. State the width-to-total-height ratio in simplest form and the roof fraction. Then describe one valid alternative roof height that keeps the total height at 20 units and state its fraction.

Answer: Width-to-total-height ratio = 10:20 = 1:2. Roof fraction = 5/20 = 1/4. A valid alternative is a roof height of 4 units, giving 4/20 = 1/5 of total height, with wall height adjusted to 16 units to keep total height at 20.

Reason: Simplify the ratio and fraction. For the alternative, choose any roof height less than 20, subtract it from 20 for the wall height, and state the new fraction. Valid alternatives are allowed because the task does not prescribe one universal roof height.

Check: Check that 1:2 means width is half the total height: 10 is half of 20. Check that 1/4 of 20 is 5. For the alternative, confirm 4 + 16 = 20 and 4/20 simplifies to 1/5.

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Source rubric / reflection

- [ ] Construction lines are light and visible before final edges.
- [ ] The main building mass is blocked as a simple rectangle or rectangle plus roof.
- [ ] Width and height are measured in one consistent unit.
- [ ] The width-to-height ratio is written and simplified correctly.
- [ ] Any height comparison uses the baseline-to-midline convention and states it.
- [ ] Shading uses at most three tonal values and follows one light direction.
- [ ] Valid alternatives are accepted if the stated convention and arithmetic are consistent.

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