Graph Paper Bull: Horn and Proportion Practice

Original tasks 1, 2, 3 / complete keys

Task 1

Plan a bull body block 7 squares long and 4 squares tall. The head is 3 squares long and overlaps the chest by 1 square. What is the total length from nose to rump in squares?

Answer: 9 squares.

Reason: The head adds 3 squares, but 1 square overlaps the body, so the added length is 3 - 1 = 2. Total is 7 + 2 = 9 squares.

Check: Count the body squares, then count only the head squares that extend beyond the chest edge; add the two counts.

Task 2

A horn plan goes outward 3 squares, up 2 squares, inward 1 square. The other horn goes outward 3, up 2, inward 2. Are the horns symmetrical? Explain using counts.

Answer: No. The inward counts differ by 1 square (1 versus 2), so the horns are not symmetrical.

Reason: Symmetry requires matching outward, upward, and inward counts. Outward and upward match, but inward does not.

Check: List the three counts for each horn side by side and compare each pair.

Task 3

Four legs are each 1 square wide and 5 squares tall. The gaps between legs are 1, 2, and 1 squares. The body block is 10 squares long. What total width do the legs and gaps span, and how many squares of body block remain uncovered at the two ends combined?

Answer: The legs and gaps span 8 squares, leaving 2 squares of body block uncovered at the two ends combined.

Reason: Leg widths total 4 x 1 = 4 squares. Gaps total 1 + 2 + 1 = 4 squares. Combined span is 4 + 4 = 8 squares. The body block is 10 squares, so 10 - 8 = 2 squares remain uncovered at the two ends combined; the split between the two ends depends on where the leg span is placed.

Check: Add leg widths and gap widths separately, then add the two sums; recount each gap on the grid. Subtract the span from the body length and confirm the remainder is 2 squares total, then check how it is divided between the two ends on your drawing.

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Original tasks 4 / complete keys

Task 4

A tail drops 4 squares from the rump and its tuft is 1 square wide. The rear leg is 1 square wide and starts 1 square left of the rump edge. Does the tail cross the rear leg if the tail starts at the rump edge? Explain with counts.

Answer: Under the grid-cell convention in this question, no interior crossing is required. A rear leg in the square immediately left of the rump can meet a tail line on the rump boundary. This is boundary contact, not a 1-square clear gap. Place the 1-square tuft outward from the rump to avoid the leg; its width alone would not determine its placement.

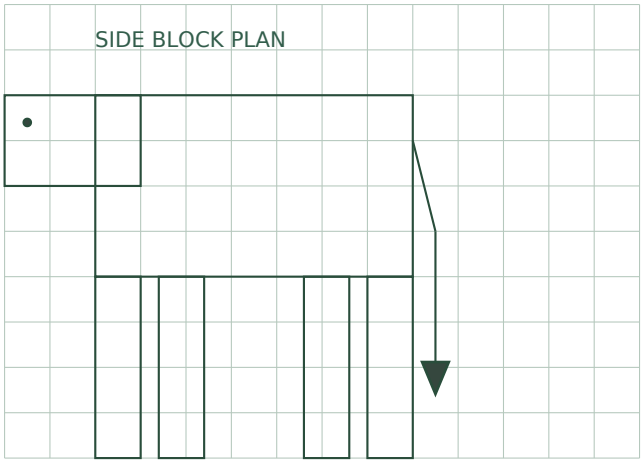
Reason: Choose the rump at x=10 for counting. The rear-leg square extends from x=9 to x=10, while the tail line starts on x=10. Their interiors do not overlap, but the common boundary may touch. A 1-square tuft can occupy x=10 to x=11 on the outward side. Claiming a full 1-square clear separation would be incorrect for these intervals.

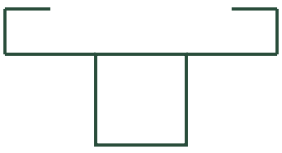
Check: Mark the rump boundary, the 1-square leg immediately to its left, the tail line on that boundary, and the chosen tuft on the outward side. Check for interior overlap separately from shared-edge contact; do not infer a positive clear gap from non-crossing.

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Task 1 / answers

Block-bull counted schematics / chosen unit = 6 mm / views are labelled separately





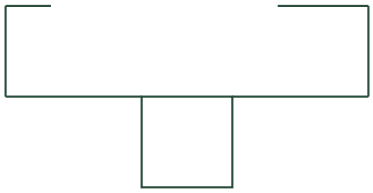
FRONT HORN INSET / 2 out, 1 up, 1 in

Body + head - overlap = 7 + 3 - 1 = 9. Each worked horn uses 2 + 1 + 1 = 4 steps.

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Task 2 / answers

Block-bull counted schematics / chosen unit = 6 mm / views are labelled separately

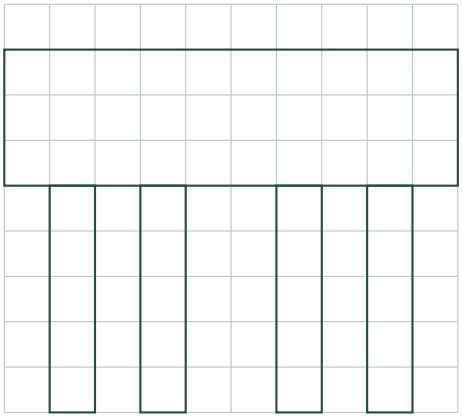


Outward 3 and upward 2 match. Inward counts 1 and 2 differ; this GIVEN pair is not symmetric. The key retains the mismatch so it can be diagnosed.

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Task 3 / answers

Block-bull counted schematics / chosen unit = 6 mm / views are labelled separately

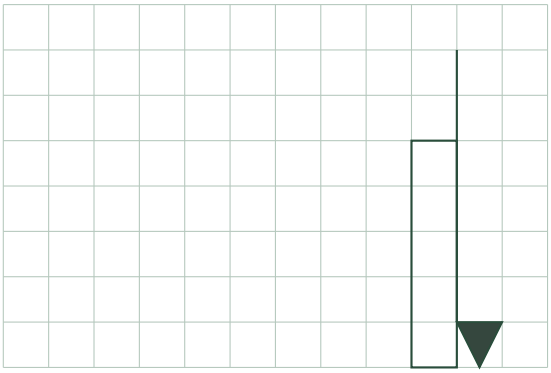


Four leg widths + gaps = 4 + (1 + 2 + 1) = 8. Body length 10 leaves 2 total. This chosen centered placement leaves 1 at each end.

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Task 4 / answers

Block-bull counted schematics / chosen unit = 6 mm / views are labelled separately



Chosen grid-cell interpretation: leg interior x=9..10, tail on edge x=10, tuft extends outward x=10..11. Interiors do not overlap; the common boundary can touch. This does not establish a 1-unit clear gap.

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Source rubric / reflection

- [ ] Body block is level and its opposite sides match by square count.
- [ ] Head attaches at the chest edge and its length is recorded in squares.
- [ ] Each horn follows the outward-up-inward plan and left-right counts match.
- [ ] Four legs are evenly spaced and all leg bottoms share one baseline.
- [ ] Tail drops from the rump without crossing the rear legs.
- [ ] Proportions are checked by counting squares, not by matching one exact style.

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