Draw a Winter Window: Frame, Frost, and Sill Construction

Original tasks 1, 2, 3 / complete keys

Task 1

Draw an outer frame 12 cm wide by 16 cm tall with a 1.5 cm border on all sides. Add one vertical mullion 1 cm wide centered in the opening. Calculate the opening width and the width of each pane.

Answer: Opening width = 12 - 1.5 - 1.5 = 9 cm. Each pane = (9 - 1) / 2 = 4 cm. The two panes total 8 cm; adding the 1 cm mullion gives the full 9 cm opening.

Reason: Subtract both side borders from the outer width to get the opening. Subtract the mullion width and divide by two for equal panes.

Check: Measure the drawn opening and mullion; confirm pane widths add to the opening width within the ruler's smallest mark.

Task 2

An opening is 10 cm wide and 14 cm tall. A horizontal mullion 1 cm tall is placed at mid-height. Calculate the height of each pane above and below the mullion.

Answer: Each pane height = (14 - 1) / 2 = 6.5 cm. The two panes total 13 cm plus the 1 cm mullion equals 14 cm.

Reason: Subtract the horizontal mullion height from the opening height, then divide by two for equal upper and lower panes.

Check: Measure the drawn pane heights and mullion; confirm they add to the opening height.

Task 3

A frame is 10 cm wide. The sill is 1.5 cm tall and extends 1 cm beyond the frame on each side. Calculate the sill width and state one check for centering.

Answer: Sill width = 10 + 1 + 1 = 12 cm. Check centering by measuring the overhang on each side; both should be 1 cm within the ruler's smallest mark.

Reason: Add the overhang on both sides to the frame width. Centering means equal overhangs.

Check: Measure left and right overhangs and compare; also confirm the sill width equals frame width plus twice the overhang.

Draw a Winter Window: Frame, Frost, and Sill Construction

Original tasks 4 / complete keys

Task 4

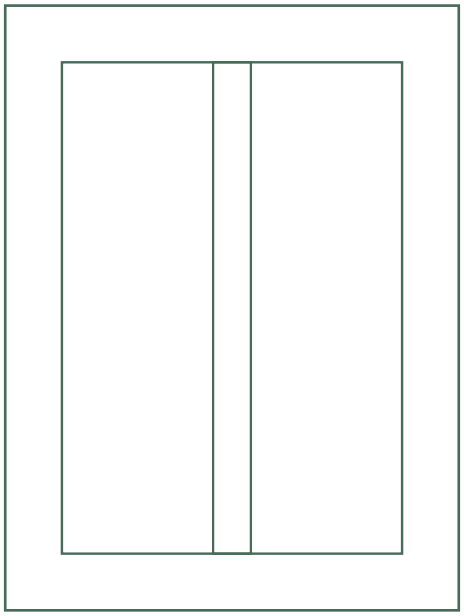
In a 9 cm by 13 cm opening, a student draws frost lines starting at corners with side branches at 30 and 60 degrees. They keep branch lengths under 3 cm and leave a 3 cm clear center. State two checks that the frost convention is consistent and contained.

Answer: Check that branch angles repeat at 30 and 60 degrees and that no frost line crosses a mullion or enters the clear center. Also confirm branch lengths stay under 3 cm.

Reason: A convention is consistent when chosen angles repeat. Containment means frost stays inside panes and respects the clear area.

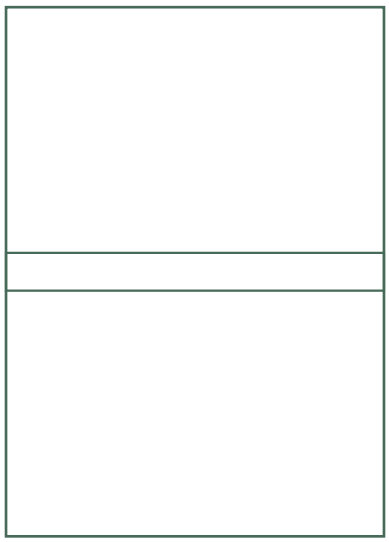
Check: Compare branch angles against the stated values and measure the clear center and branch lengths with a ruler.

Window construction / printed diagram scale 1:2 of the labelled hypothetical lengths



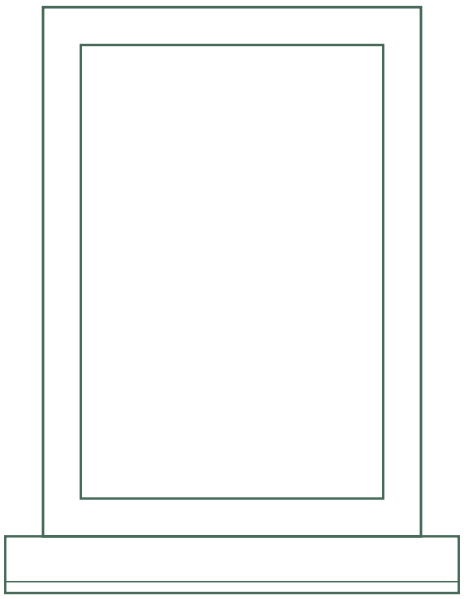
Opening 9 x 13 cm / panes 4 + 4 cm / plus the 1 cm mullion = 9 cm

Window construction / printed diagram scale 1:2 of the labelled hypothetical lengths



Opening 10 x 14 cm / each pane (14 - 1) / 2 = 6.5 cm high

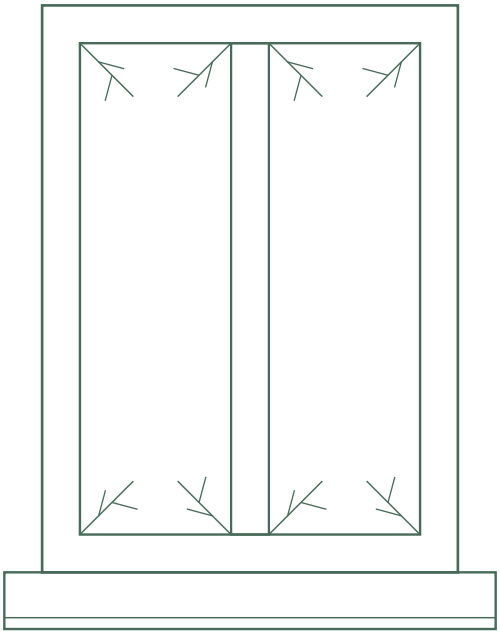
Window construction / printed diagram scale 1:2 of the labelled hypothetical lengths



Given frame width 10 cm / sill 12 x 1.5 cm / equal overhangs 1 cm

Frame height 14 cm and border 1 cm are chosen here because this question fixes only the width and sill. Compare the equal left and right overhangs.

Window construction / printed diagram scale 1:2 of the labelled hypothetical lengths



Given: 9 x 13 cm opening; 30/60 degree side branches; lengths under 3 cm.

Chosen supporting frame, 1 cm vertical bar and 3 x 3 cm clear-center square are illustrative. Branch angles are measured from each main frost line, not the paper edge.

Checks: repeated 30/60 degree branch angles; all segments remain inside their own panes and outside the central clear area. Each side branch is 7 mm, safely under 30 mm.

Draw a Winter Window: Frame, Frost, and Sill Construction

Source rubric / reflection

- [ ] Outer frame is a measured rectangle with equal diagonals within the ruler's smallest mark.
- [ ] Frame border width is equal on all four sides and the opening is labeled.
- [ ] Mullions are measured from the opening edges and pane widths add up to the opening width.
- [ ] Sill is centered, projects equally on both sides, and has a clear front edge line.
- [ ] Frost uses a defined branch-angle convention, stays inside panes, and leaves a clear central area.
- [ ] Drawing is limited to the window object; no interior room or building perspective is added.
- [ ] Final outlines are clear and construction lines are lightened or erased.
- [ ] Frost remains inside the glass, clear of mullions and the chosen central viewing area; any text label stays outside those construction details.

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