Draw Tower Bridge: Twin Towers, Chains, and Bascule Span

Original tasks 1, 2, 3 / complete keys

Task 1

A drawing has towers 4 cm wide and 14 cm tall, with a 8 cm bascule span. The walkway is marked 3 cm below the tower tops. What is the walkway height above the baseline, and what is the total width between the outer tower edges?

Answer: Walkway height is 11 cm above the baseline. Total width between outer tower edges is 4 + 8 + 4 = 16 cm.

Reason: Subtract the walkway offset from tower height: 14 - 3 = 11 cm. Add the two tower widths and the span: 4 + 8 + 4 = 16 cm.

Check: Re-add the parts: 4 + 8 + 4 = 16. Confirm 14 - 3 = 11 by adding 3 back to 11 to get 14.

Task 2

On a 40 cm wide paper, towers are 5 cm wide, the span is 10 cm, and abutments are 6 cm outside each tower. Does the full bridge fit with 2 cm margins on each side? Show the arithmetic.

Answer: Full width is 6 + 5 + 10 + 5 + 6 = 32 cm. With 2 cm margins on each side, required width is 32 + 2 + 2 = 36 cm, which fits on 40 cm paper.

Reason: Add abutment offsets, tower widths, and span to get the bridge width. Add margins and compare to paper width.

Check: Subtract the required width from paper width: 40 - 36 = 4 cm spare. Recalculate the bridge width in a different order to confirm 32 cm.

Task 3

A student draws the left chain from 9 cm above the baseline to an abutment 4 cm outside the left tower. The right chain starts at 9 cm but ends 7 cm outside the right tower. Describe one correction that makes the pair more symmetric and state the new right abutment distance if you match the left.

Answer: Move the right abutment to 4 cm outside the right tower so both chains span the same horizontal distance. The new right abutment distance is 4 cm.

Reason: Symmetry in this guide means matching horizontal offsets from the towers, not forcing identical freehand curves. Matching the offset makes the pair read as a matched set.

Check: Compare left and right offsets: both should be 4 cm. Measure from the outer tower edge to the abutment mark on each side.

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Original tasks 4 / complete keys

Task 4

A tower is 12 cm tall. The walkway is 2 cm below the top, and a chain attachment is 1 cm below the walkway. What is the chain attachment height above the baseline? If the abutment is on the baseline, what is the vertical drop of the chain?

Answer: Chain attachment height is 9 cm above the baseline. The vertical drop to the baseline abutment is 9 cm.

Reason: Subtract walkway offset and chain offset from tower height: 12 - 2 - 1 = 9 cm. The drop from attachment to baseline is the same 9 cm.

Check: Add back: 9 + 1 + 2 = 12 cm. Confirm the drop by subtracting baseline height (0 cm) from attachment height (9 cm).

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Source rubric / reflection

- [ ] Two towers are equal in width and height within 0.5 cm.
- [ ] Bascule span is horizontal and connects the inner tower edges.
- [ ] Walkway is horizontal at the marked level and connects both towers.
- [ ] Suspension chains curve smoothly from tower attachments to abutments.
- [ ] Left and right chain curves read as a matched pair.
- [ ] Main outlines are clear and construction lines are removed.
- [ ] Handwriting follows the convention: x-height is baseline to midline; letter styles may vary but spacing is consistent.
- [ ] Valid alternatives are accepted if proportions and structural relationships remain clear.

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