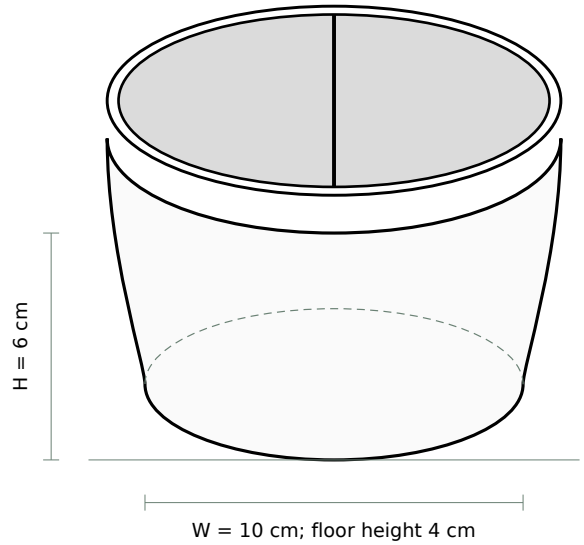
Draw an Upside-Down Hard Hat: Inverted Brim and Ridge

WORKED EXAMPLE / SEPARATE ANSWER

A student draws a floor ellipse 10 cm wide and 4 cm tall, then a bowl 6 cm high. The brim is drawn as a separate ellipse 12 cm wide and 5 cm tall, offset 1 cm above the open-rim ellipse. The ridge is drawn as a straight vertical line inside the bowl. Identify two problems and suggest fixes.

Drawing scale 1:2 / front-shell H, not full outside height

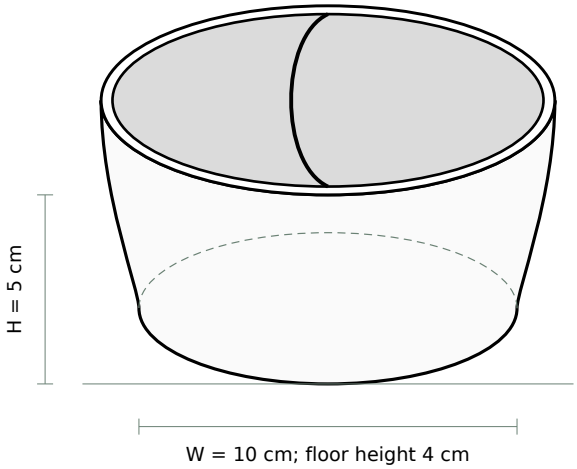
GIVEN / shifted band + straight ridge



W = 10 cm; floor height 4 cm

Brim 12 x 5 cm; center shifted up 1 cm

ONE CORRECTION / attached band + curve



W = 10 cm; floor height 4 cm

Brim 12 x 5 cm; center aligned

Two valid model responses are: (1) H = 6 cm is more than half of W = 10 cm. Lower H to 5 cm or less, or keep H = 6 cm and choose W at least 12 cm. (2) Replace the straight interior ridge with a smooth curve joining the front and back inner rim while staying within the opening. The separate brim shifted 1 cm above the opening is another valid problem to identify: center its two band edges on the opening and attach the band to the shell. The prompt asks for two problems, so a supported brim diagnosis can replace either model response. The given 12 cm by 5 cm brim dimensions need not change; remove the center offset. All fixes use the stated hypothetical drawing convention.

Check: 6/10 = 0.6, while 5/10 = 0.5. The corrected band shares the opening center, its size remains 12 x 5 cm, and the curved ridge joins the inner rim. The original 1 cm shift and straight line are intentionally shown only in the GIVEN panel.

Hypothetical drawing convention. Numeric diagrams use scale 1:2 at 100% print size; double paper lengths to record task centimetres. H is baseline to the lowest front outer-brim point, not the full outside height. The lower ellipse is a projected crown guide, not a floor-contact patch.

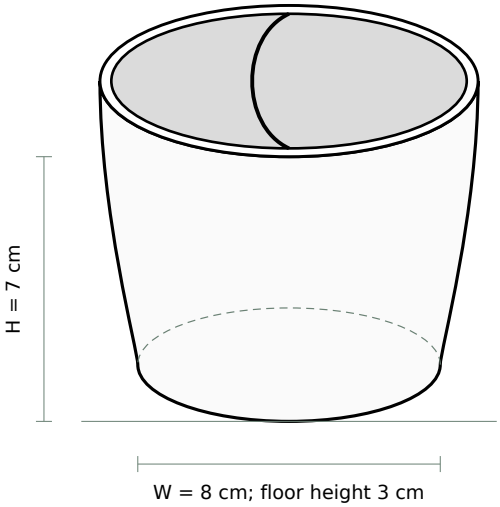
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EXERCISE 1 / SEPARATE ANSWER

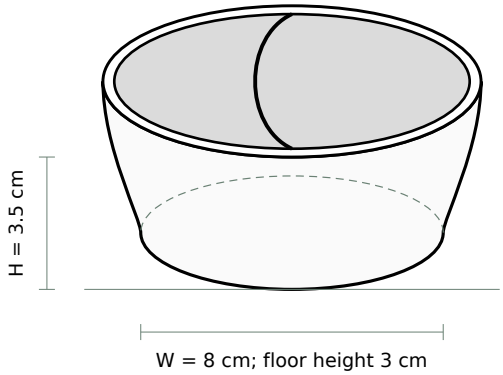
Describe how to adjust a drawing where the floor ellipse is 8 cm wide and 3 cm tall, but the bowl is 7 cm high. What change makes the hat look more like a hard hat?

Floor 8 x 3 cm retained; brim 10 x 4 cm is an illustrative choice

GIVEN / H 7 exceeds W 8 / 2



ONE CORRECTION / H 3.5 <= W 8 / 2



If H stays 7 cm, choose W at least 14 cm. W 10 alone is insufficient.

Keep the 8 cm floor width and lower H from 7 cm to about 3 to 4 cm. Alternatively, if H stays 7 cm, widen W to at least 14 cm. Either change satisfies this lesson's chosen H <= W/2 rule. A width of 10 cm works only if height is also reduced to 5 cm or less.

Why: Initially H/W = 7/8 = 0.875. Lowering H to 4 cm gives 4/8 = 0.5; retaining H = 7 cm and choosing W = 14 cm gives 7/14 = 0.5. Widening to 10 cm alone gives 0.7 and does not meet the stated practice rule.

Check: Measure W across the floor ellipse and H from its lowest baseline point to the lowest front brim point. Confirm H <= W/2. The 3 cm floor-ellipse height is a separate given and is not H.

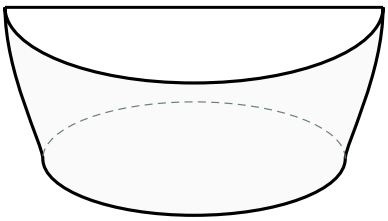
Hypothetical drawing convention. Numeric diagrams use scale 1:2 at 100% print size; double paper lengths to record task centimetres. H is baseline to the lowest front outer-brim point, not the full outside height. The lower ellipse is a projected crown guide, not a floor-contact patch.

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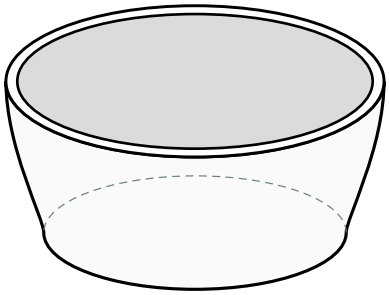
EXERCISE 2 / SEPARATE ANSWER

A drawing shows the brim as a single flat line across the top of the bowl. Explain why this is incorrect and describe the correct construction.

GIVEN / one flat line



CORRECTED / two nested closed ellipses



Unstated sizes are illustrative. The band shares the opening center; it does not float above it.

For this drawing convention, the brim is a band at the upper opening. Replace the single line with two close closed ellipses sharing a center and axis: the outer brim edge and the smaller inner opening. Keep the band attached to the shell; their gap shows drawn band width, not a specified equipment thickness.

Why: A single line cannot describe the selected view of an opening surrounded by a band. The two nested contours make that chosen construction visible.

Check: Look for two closed ellipses near the open rim with a visible gap. If you see only one line, the brim is incomplete.

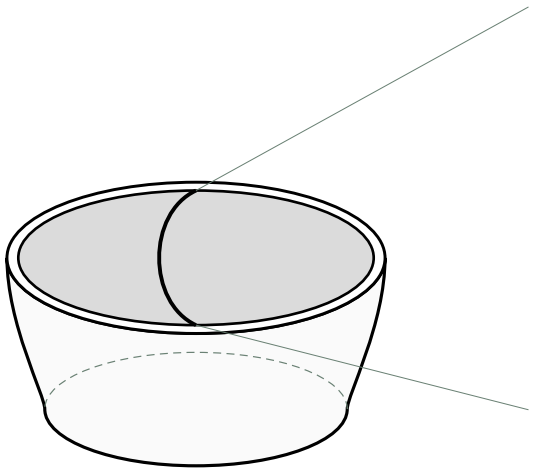
Hypothetical drawing convention. Numeric diagrams use scale 1:2 at 100% print size; double paper lengths to record task centimetres. H is baseline to the lowest front outer-brim point, not the full outside height. The lower ellipse is a projected crown guide, not a floor-contact patch.

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EXERCISE 3 / SEPARATE ANSWER

You are drawing the interior ridge. Where should it start and end, and how should it curve?

Chosen central interior curve / one bare-shell construction cue



Both ends meet inner rim; the curve stays inside the opening. No universal hardware claim.

In the selected bare-shell diagram, start at the front inner rim and end at the back inner rim. Use one smooth curve passing near the center and staying within the opening.

Why: This is the lesson's chosen interior form cue. Curvature distinguishes it from the intentionally straight line in the worked example; it does not certify the internal structure of every real hard hat.

Check: Trace the curve: both endpoints must touch the inner rim and all intermediate points must remain inside the opening. It should be curved rather than a straight front-to-back segment.

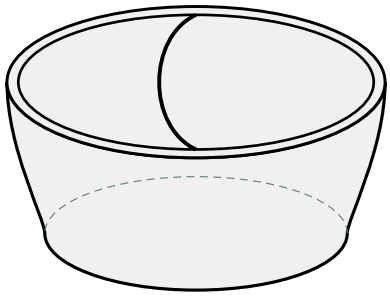
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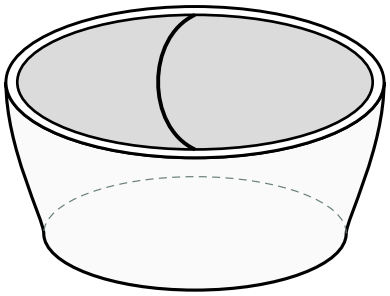
EXERCISE 4 / SEPARATE ANSWER

A student shades the entire hat evenly, including the interior. What is one fix to make the inversion clearer?

GIVEN / all regions same value



ONE FIX / darker interior, lighter brim



This is the lesson value scheme, not a universal lighting rule.

Darken the interior of the bowl slightly and keep the brim ring lighter. This creates a value difference that shows depth.

Why: Under the chosen illustration value scheme, a darker interior and lighter brim separate recessed and outer regions. Actual lighting can differ; the task asks for this particular drawing cue.

Check: Compare the interior and exterior values. The interior should be noticeably darker but not black.

Hypothetical drawing convention. Numeric diagrams use scale 1:2 at 100% print size; double paper lengths to record task centimetres. H is baseline to the lowest front outer-brim point, not the full outside height. The lower ellipse is a projected crown guide, not a floor-contact patch.

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RUBRIC AND REFLECTION

Use these checks after the worked model and four exercises. They describe the chosen illustration, not equipment dimensions. For an observed three-quarter view, adapt the projection rather than forcing the symmetric front-view test.

1. Floor construction ellipse is shallow, centered, and tangent to the baseline at its lowest point; its rear half is a guide, not a full physical contact patch.
2. Bowl-shaped shell rises from the floor ellipse and reads as inverted.
3. Brim is an attached band between close concentric ellipses at the upper opening.
4. Ridge lines are inside the bowl and curve with the interior surface.
5. The selected value scheme has a slightly darker interior and a lighter exterior and brim.
6. The chosen practice dimensions satisfy H <= W/2, with H measured to the lowest front brim point.
7. The arrangement reads as an inverted hard-hat shell: crown below, opening above. A page turn does not expose hidden surfaces.

- [ ] I answered the requested task and labeled my choices.
- [ ] I used the same view and measurement convention throughout.
- [ ] I checked the result and recorded one reason or measurement.

A valid alternative I chose and why it remains consistent:

One numerical or visual check I made:

One change for my next drawing:
