Graffiti Dice Drawing: Lettered Cube Faces with Shading

Original tasks 1, 2, 3 / complete keys

Task 1

A cube net uses 5 cm squares. A letter on the top face has its baseline 1 cm from the bottom edge and its midline 3.5 cm from the bottom edge. What is the x-height in centimeters?

Answer: 2.5 cm

Reason: Subtract the baseline distance from the midline distance: 3.5 cm - 1 cm = 2.5 cm. The x-height is the gap between baseline and midline.

Check: Re-measure the two distances on the net square and confirm the difference equals 2.5 cm; the value must be less than the 5 cm face size.

Task 2

An isometric cube has a light arrow pointing from the upper right. The three visible faces are top, front, and left side. Which visible face should be shaded darkest, and which lightest?

Answer: The left side face should be darkest; the top face should be lightest.

Reason: Light from the upper right strikes the top face most directly and the left side face least directly, so the left side receives the darkest shading and the top the lightest.

Check: Confirm the arrow direction and compare each face angle to the light; the face facing away from the light should have the darkest shading.

Task 3

On a 6 cm cube face, a letter is drawn with 0.3 cm clearance from the left edge and 0.4 cm from the right edge. The letter width is 4.8 cm. Does the letter fit within the face with at least 0.5 cm clearance on both sides? Show the arithmetic.

Answer: No. Total used width is 0.3 + 4.8 + 0.4 = 5.5 cm, leaving 0.5 cm total, not 0.5 cm on each side. The left clearance is 0.3 cm and the right is 0.4 cm, both below 0.5 cm.

Reason: Add the clearances and letter width, then compare each clearance to the 0.5 cm requirement. The sum fits the 6 cm face, but the individual clearances fail.

Check: Re-add 0.3 + 4.8 + 0.4 = 5.5 cm and check that 6 - 5.5 = 0.5 cm total remaining; then verify each side clearance separately against 0.5 cm.

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Original tasks 4 / complete keys

Task 4

A cube has a 6 cm edge. A cast shadow is drawn 2 cm long on the ground plane, starting at the cube's right edge and extending away from the cube. If the light direction is from the upper left, on which side of the cube should the shadow appear, and what is the total horizontal distance from the cube's left edge to the shadow's far end?

Answer: The shadow should appear on the lower right side. The total horizontal distance is 6 cm + 2 cm = 8 cm from the cube's left edge to the shadow's far end.

Reason: Light from the upper left casts a shadow to the lower right. The shadow starts at the cube's right edge, which is 6 cm from the left edge, and extends 2 cm beyond it, giving 6 + 2 = 8 cm total.

Check: Confirm the shadow direction is opposite the light arrow, then add the cube edge length and shadow length: 6 + 2 = 8 cm.

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Source rubric / reflection

- [ ] Cube net has six equal squares with labeled faces and clear margins.
- [ ] Each face has one letter or short word with main body inside a consistent baseline-to-midline band.
- [ ] Letters keep at least 0.5 cm clearance from face edges on the net.
- [ ] Isometric cube shows three visible faces with letters transferred and slanted to follow face edges.
- [ ] Shading follows one marked light direction, with the darkest visible face opposite the light.
- [ ] Letters remain legible against shaded areas through outlines or lighter fill near edges.
- [ ] Cast shadow is placed opposite the light direction and is proportionate to the cube.
- [ ] Valid alternative letter styles are accepted if x-height consistency and legibility are maintained.

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