Life-Size Black Bear Paw Print: True-Scale Layout and Scaling

Original tasks 1, 2, 3, 4 / complete keys

Task 1

A full-size print is 20 cm long and 16 cm wide. Calculate the length and width at 50% and at 25%.

Answer: 50%: 10 cm long, 8 cm wide. 25%: 5 cm long, 4 cm wide.

Reason: Multiply each measurement by 0.5 and by 0.25; both dimensions use the same factor.

Check: Confirm 10 is half of 20 and 5 is a quarter of 20; confirm 8 is half of 16 and 4 is a quarter of 16.

Task 2

A drawn outline has a pad height of 6 cm and a toe arc height of 11 cm. The recorded overall length is 18 cm. Does the layout check within 0.5 cm?

Answer: No. 6 + 11 = 17 cm, which is 1 cm short of 18 cm.

Reason: Add pad height and toe arc height, then compare with the overall length.

Check: Subtract the sum from the overall length: 18 - 17 = 1 cm, which exceeds 0.5 cm.

Task 3

At 1:1 the main pad is 9 cm wide. A student draws a 25% outline with a pad 3 cm wide. Is the proportion correct?

Answer: No. The expected pad width is 9 × 0.25 = 2.25 cm, so 3 cm is too wide.

Reason: The pad width must be reduced by the same factor as the overall outline.

Check: Multiply 9 by 0.25 and compare with the drawn 3 cm; the difference is 0.75 cm.

Task 4

A comparison strip shows a 50% outline 9 cm long and a 25% outline 5 cm long. The full-size outline is 18 cm long. Which reduced outline is inconsistent, and by how much?

Answer: The 25% outline is inconsistent. It should be 18 × 0.25 = 4.5 cm, so it is 0.5 cm too long.

Reason: Each reduced length must equal the full length multiplied by its factor.

Check: Calculate 18 × 0.5 = 9 cm, which matches; calculate 18 × 0.25 = 4.5 cm and subtract from 5 cm to get 0.5 cm.

Life-Size Black Bear Paw Print: True-Scale Layout and Scaling

Source rubric / reflection

- [ ] Full-size outline includes five labeled toe zones and one labeled main pad zone.
- [ ] Overall length and width are recorded in centimetres from ruler measurements.
- [ ] 50% and 25% outlines use the same factor for length and width.
- [ ] Pad width ratio is preserved across all three outlines within 0.5 cm.
- [ ] Labels are clear and the comparison strip shows each scale factor.
- [ ] Alternative outline shapes are accepted if proportions and labels are consistent.

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