Civil War Cannon Scale Drawing: Barrel, Carriage, and Wheel Proportions

Original tasks 1, 2, 3 / complete keys

Task 1

A cannon reference gives barrel length 240 cm, carriage length 150 cm, carriage height 75 cm, and wheel diameter 120 cm. Use scale 1:20. Calculate all drawing sizes and state the wheel radius.

Answer: Barrel = 12 cm, carriage length = 7.5 cm, carriage height = 3.75 cm, wheel diameter = 6 cm, wheel radius = 3 cm.

Reason: Divide each real measurement by 20. The wheel radius is half the drawing diameter: 6 ÷ 2 = 3 cm.

Check: Multiply each drawing size by 20 and confirm it returns the original real measurement.

Task 2

A drawing uses scale 1:15. The drawn barrel is 14 cm and the drawn wheel diameter is 8 cm. What are the real barrel length and real wheel diameter?

Answer: Real barrel length = 210 cm; real wheel diameter = 120 cm.

Reason: Multiply each drawing size by 15: 14 × 15 = 210, and 8 × 15 = 120.

Check: Divide the answers by 15 and confirm they return 14 cm and 8 cm.

Task 3

A cannon has a wheel diameter of 100 cm and a carriage height of 70 cm. At scale 1:10, what is the wheel radius in the drawing, and how high above the baseline is the wheel centre?

Answer: Wheel radius = 5 cm; wheel centre is 5 cm above the baseline.

Reason: Drawing wheel diameter = 100 ÷ 10 = 10 cm, so radius = 5 cm. The centre sits one radius above the baseline so the rim touches it.

Check: Confirm that centre height plus radius equals the wheel diameter above the baseline: 5 + 5 = 10 cm.

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Original tasks 4 / complete keys

Task 4

A student draws a barrel 20 cm long, a carriage 10 cm long, and a wheel 8 cm in diameter at scale 1:10. The real barrel is 200 cm and the real carriage is 100 cm. The real wheel is 90 cm. Which drawing size is incorrect, and what should it be?

Answer: The wheel is incorrect. It should be 9 cm in diameter.

Reason: Barrel 200 ÷ 10 = 20 cm and carriage 100 ÷ 10 = 10 cm are correct. Wheel 90 ÷ 10 = 9 cm, not 8 cm.

Check: Multiply each drawing size by 10 and compare to the real values: 20→200, 10→100, 8→80, which does not match 90.

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Source rubric / reflection

- [ ] Scale factor is stated and used consistently for all measurements.
- [ ] Barrel length, carriage length, and wheel diameter match the converted table values within a small stated tolerance.
- [ ] Wheel is drawn as a circle in side view with the rim touching the baseline.
- [ ] Barrel shows a visible taper from breech to muzzle.
- [ ] Carriage is centred under the barrel and its height matches the converted value.
- [ ] Construction lines are light and the final outline is clear.
- [ ] Valid alternative conventions are accepted if stated and applied consistently.

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