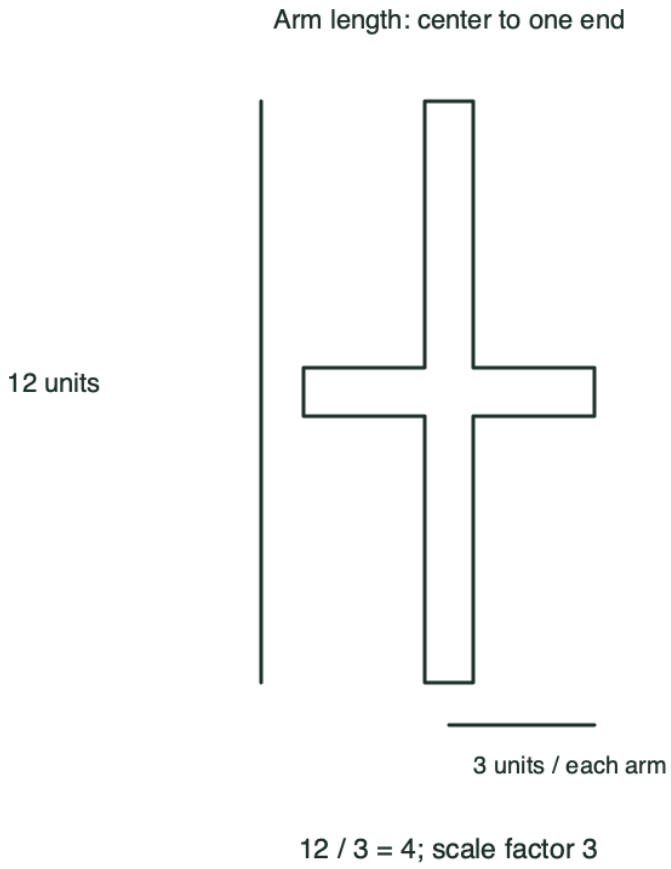
# Draw a Properly Proportioned Cross to Scale

EXERCISE 1 / ANSWERS

Context: Measure arm length outward from the center on both sides and mark the ends.

Construct a cross with ratio 4:1 and scale factor 3. State post height and arm length, describe the grid steps, and perform the check.




Post height 12 units, arm length 3 units. Mark center, post top and bottom, arm line, and arm ends on a square grid; draw rectangles; measure and divide 12 by 3 to get 4.

Why: Multiply both ratio parts by 3: 4 times 3 is 12, 1 times 3 is 3. The check confirms the ratio.

Check: Measure post height and arm length in the same unit; compute post height divided by arm length; compare to 4.

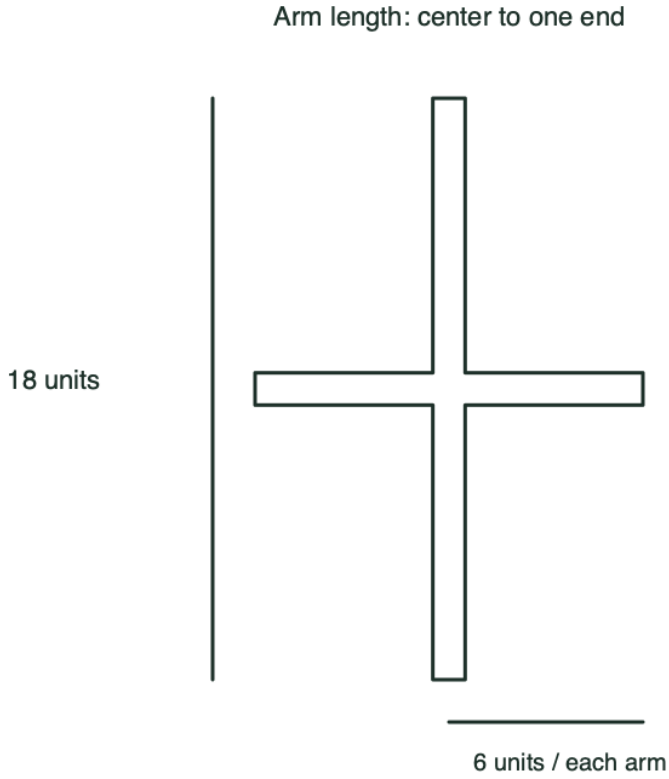
Illustrative construction, not printed at actual size.

# Draw a Properly Proportioned Cross to Scale

EXERCISE 2 / ANSWERS

Context: Measure arm length outward from the center on both sides and mark the ends.

A drawing has post height 18 units and arm length 6 units. What ratio does it express, and what scale factor was used if the base ratio is 3:1?




Ratio 3:1; scale factor 6.

Why: 18 divided by 6 equals 3, so the ratio is 3:1. Since 3 times 6 is 18 and 1 times 6 is 6, the scale factor is 6.

Check: Multiply the base ratio by the claimed scale factor and compare to the given measurements.

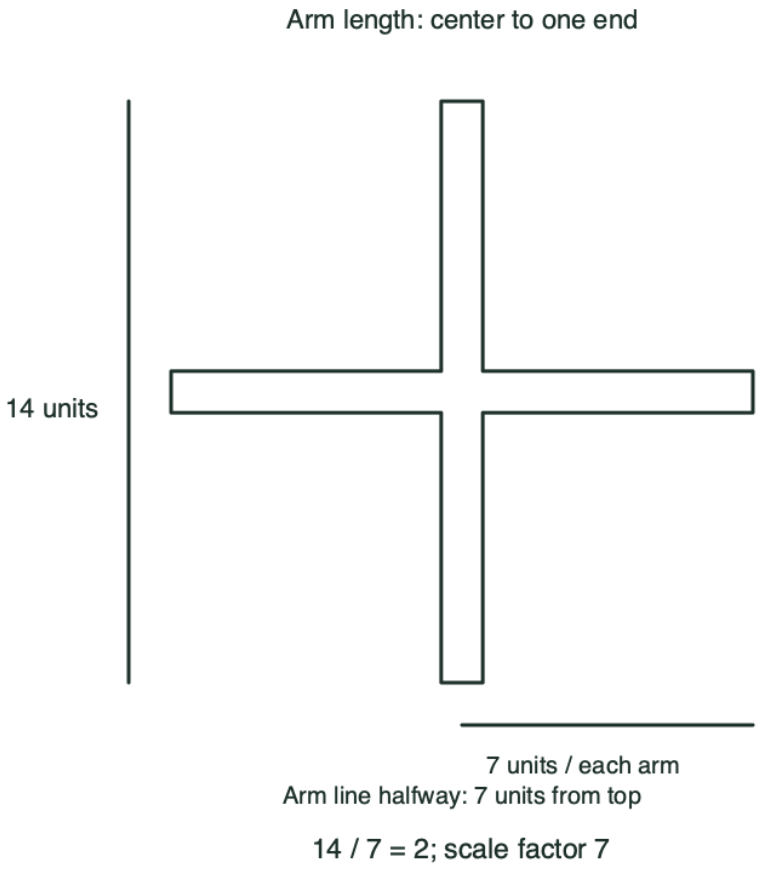
Illustrative construction, not printed at actual size.

# Draw a Properly Proportioned Cross to Scale

EXERCISE 3 / ANSWERS

Context: Measure arm length outward from the center on both sides and mark the ends.

Construct a cross with ratio 2:1 and scale factor 7, but place the arm line halfway down the post. State measurements and check the ratio.




Post height 14 units, arm length 7 units, arm line at 7 units from the top. Measure 14 and 7; 14 divided by 7 equals 2.

Why: Multiply 2 and 1 by 7. The arm line position is a separate design choice and does not change the ratio check.

Check: Measure post height and arm length only; divide and compare to 2.

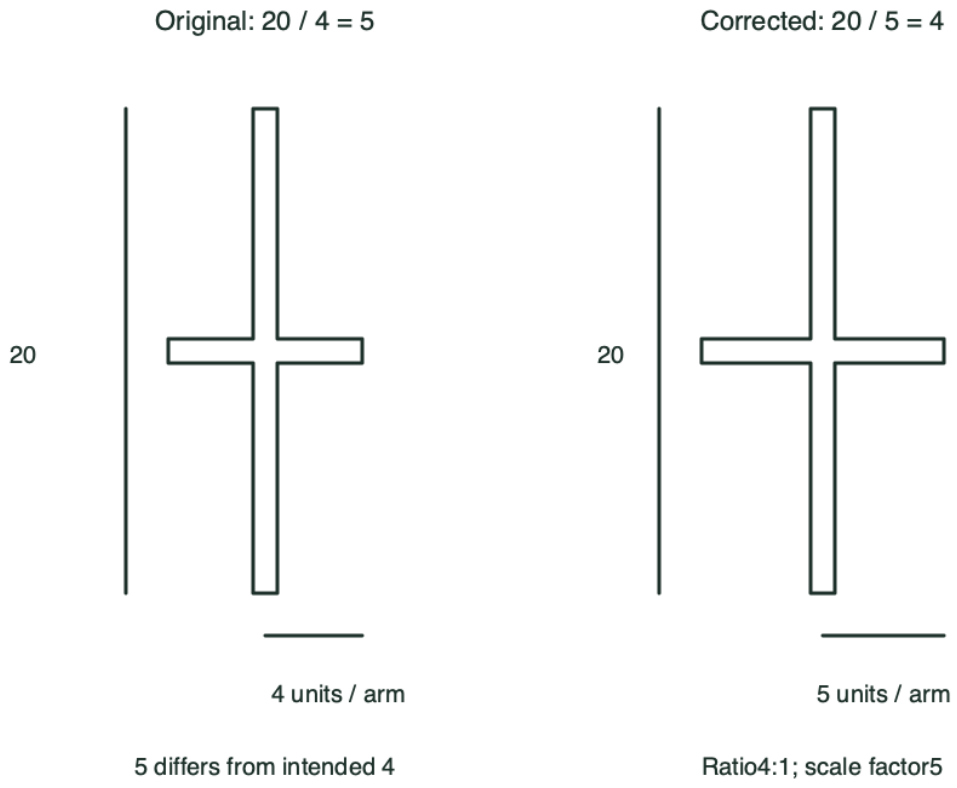
Illustrative construction, not printed at actual size.

# Draw a Properly Proportioned Cross to Scale

EXERCISE 4 / ANSWERS

Context: Measure arm length outward from the center on both sides and mark the ends.

Your measured post height is 20 units and arm length is 4 units. You intended ratio 4:1. Is the drawing correct, and what should you do if it is not?




No; 20 divided by 4 equals 5, not 4. Recompute with a new scale factor, for example scale factor 5 gives post 20 and arm 5 for ratio 4:1, then redraw.

Why: The check compares measured post height divided by measured arm length to the intended ratio. A mismatch means the scale factor or measurement is wrong.

Check: Divide 20 by 4 to get 5; compare to 4; if different, recompute both measurements from the ratio and scale factor.

Illustrative construction, not printed at actual size.