Written Exercises

In each of Exercises 1–4 begin by drawing $\overline{AB}$ roughly 15 cm long.

A **1.** Divide $\overline{AB}$ into three congruent segments.

2. a. Use Construction 12 to divide $\overline{AB}$ into four congruent segments.

b. Use Construction 4 to divide $\overline{AB}$ into four congruent segments.

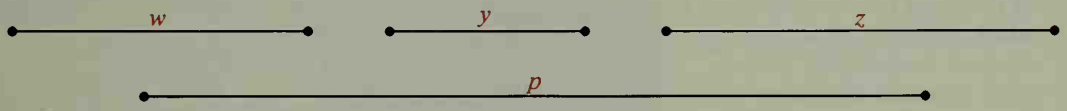
3. a. Use Construction 12 to divide $\overline{AB}$ into five congruent segments.

b. Can Construction 4 be used to divide $\overline{AB}$ into five congruent segments?

c. Divide $\overline{AB}$ into two segments that have the ratio 2:3.

4. Divide $\overline{AB}$ into two segments that have the ratio 3:4.

On your paper draw four segments roughly as long as those shown below. Use your segments in Exercises 5–14. In each exercise construct a segment that has length x satisfying the given condition.



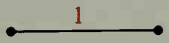
5. $\frac{y}{w} = \frac{z}{x}$ **6.** $\frac{w}{x} = \frac{x}{y}$ **7.** $x = \sqrt{yp}$ **8.** $3x = w + 2y$

B **9.** $zx = wy$ (*Hint*: First write a proportion that is equivalent to the given equation and has x as the last term.)

10. $x = \frac{yp}{z}$ **11.** $x = \frac{1}{3}\sqrt{yp}$ **12.** $x = \sqrt{3wz}$ **13.** $x = \sqrt{6yz}$

14. Construct $\overline{AB}$, with $AB = p$. Divide $\overline{AB}$ into two parts that have the ratio $w:y$.

15. Draw a segment like the one shown and let its length be 1. Use the segment to construct a segment of length $\sqrt{15}$.



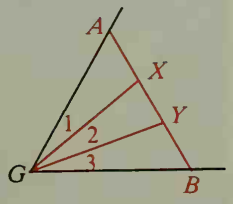
16. a. If $x = a\sqrt{n}$, then x is the geometric mean between a and $\underline{?}$.

b. Draw a segment about 3 cm long. Call its length a. Use your results from part (a) to construct a segment of length $a\sqrt{n}$ for $n = 2$, 3, and 4.

C **17.** Draw $\overline{CD}$ about 20 cm long. Construct a triangle whose perimeter is equal to CD and whose sides are in the ratio 2:2:3.

★ **18.** To trisect a general angle G, a student tried this procedure:

1. Mark off $\overline{GA}$ congruent to $\overline{GB}$.
2. Draw $\overline{AB}$.
3. Divide $\overline{AB}$ into three congruent parts using Construction 12.
4. Draw $\overline{GX}$ and $\overline{GY}$.



Show that the student did not trisect $\angle G$. (*Hint*: Show that $GA > GY$. Then use an indirect proof to show that $m\angle 2 \neq m\angle 1$.)