27. Draw three noncollinear points R, S, and T. Construct a triangle whose sides have R, S, and T as midpoints. (*Hint*: How is $\overline{RT}$ related to the side of the triangle that has S as its midpoint?)

28. Draw a segment and let its length be 1.

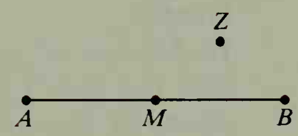
a. Construct a segment of length $\sqrt{5}$.

b. Construct a segment of length $\frac{1}{2} + \frac{\sqrt{5}}{2}$, or $\frac{1 + \sqrt{5}}{2}$.

c. Construct a *golden rectangle* (as discussed on page 253) whose sides are in the ratio $1 : \frac{1 + \sqrt{5}}{2}$.

Challenge

Given $\overline{AB}$, its midpoint M, and a point Z outside $\overline{AB}$, use only a straightedge (and *no* compass) to construct a line through Z parallel to $\overleftrightarrow{AB}$. (*Hint*: Use Ceva's Theorem, Exercise 33, page 273.)



Explorations

These exploratory exercises can be done using a computer with a program that draws and measures geometric figures.

1. Draw any $\triangle ABC$. Draw the bisectors of the angles of the triangle. They should intersect in one point. Draw a perpendicular segment from this point to each of the sides. Measure the length of each perpendicular segment. What do you notice?

2. a. Draw any acute $\triangle ABC$. Draw the perpendicular bisector of each side of the triangle. They should intersect in one point. Measure the distance from this point of intersection to each of the vertices of the triangle. What do you notice?

b. Repeat using an obtuse triangle and a right triangle. Is the same result true for these triangles as well?

c. In a right triangle, the perpendicular bisectors of the sides intersect in what point?

3. Draw any $\triangle ABC$. Draw the three medians. They should intersect in one point, as shown in the diagram at the right. Find the ratios $\frac{AG}{AD}$, $\frac{BG}{BE}$, and $\frac{CG}{CF}$. What do you notice?