

## Classroom Exercises

- Given a segment, tell how to construct an equilateral triangle whose perimeter equals the length of the given segment.

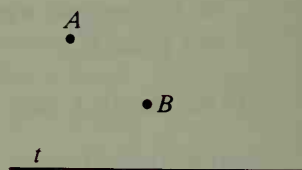
Draw three segments and label their lengths  $a$ ,  $b$ , and  $c$ .

- Construct a segment of length  $x$  such that  $\frac{c}{a} = \frac{b}{x}$ .
- Describe how to construct a segment of length  $x$  such that  $x = \sqrt{2ab}$ .
- Describe how to construct a segment of length  $x$  such that  $x = \sqrt{5ab}$ .
- Describe how to construct a segment of length  $x$  such that  $x = \sqrt{4ab}$ .

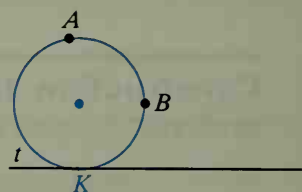
Exercises 6–11 will analyze the following problem.

Given: Line  $t$ ; points  $A$  and  $B$

Construct: A circle through  $A$  and  $B$  and tangent to  $t$

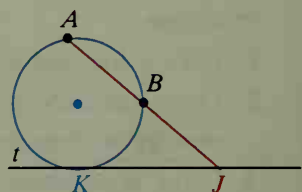


If the problem had been solved, we would have a diagram something like the one shown.



- Where does the center of the circle lie with respect to  $\overline{AB}$ ?
- Where does the center of the circle lie with respect to line  $t$  and  $K$ , the point of tangency?

Note that we don't have point  $K$  located in the given diagram. Hunting for ideas, we draw  $\overleftrightarrow{AB}$ . We now have a point  $J$ , which we can locate in the given diagram.



- State an equation that relates  $JK$  to  $JA$  and  $JB$ .
- Rewrite your equation in the form  $\frac{?}{JK} = \frac{JK}{?}$ .
- What construction can we use to get the length  $JK$ ?

In a *separate* diagram we can mark off the lengths  $JA$  and  $JB$  on some line  $l$  and then use Construction 14 to find  $x$  such that  $\frac{JA}{x} = \frac{x}{JB}$ . Once we have  $x$ , which equals  $JK$ , we return to the given diagram and draw an arc to locate  $K$ .

- Explain how to complete the construction of the circle.

