Classroom Exercises

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

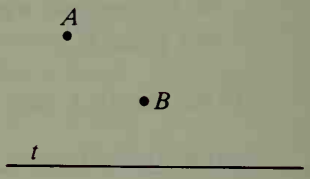
Draw three segments and label their lengths a, b, and c.

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

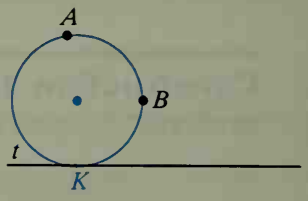
Exercises 6–11 will analyze the following problem.

Given: Line t; points A and B

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

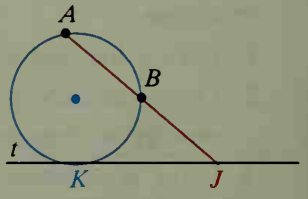


If the problem had been solved, we would have a diagram something like the one shown.



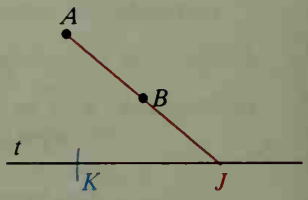
6. Where does the center of the circle lie with respect to $\overline{AB}$?
7. Where does the center of the circle lie with respect to line t and K, the point of tangency?

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.



8. State an equation that relates JK to JA and JB.
9. Rewrite your equation in the form $\frac{?}{JK} = \frac{JK}{?}$.
10. 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.



11. Explain how to complete the construction of the circle.