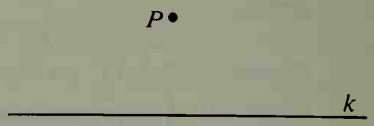
Construction 7

Given a point outside a line, construct the parallel to the given line through the given point.

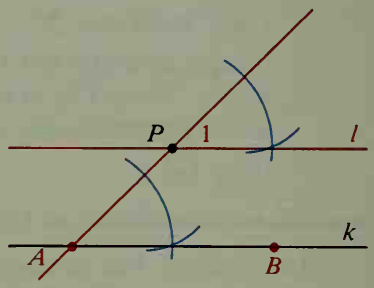


Given: Point P outside line k

Construct: The line through P parallel to k

Procedure:

1. Let A and B be two points on line k. Draw $\overleftrightarrow{PA}$.
2. At P, construct $\angle 1$ so that $\angle 1$ and $\angle PAB$ are congruent corresponding angles. Let l be the line containing the ray you just constructed.



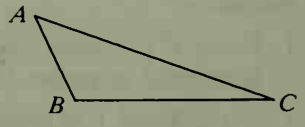
l is the line through P parallel to k.

Justification: If two lines are cut by a transversal and corresponding angles are congruent, then the lines are parallel. (Postulate 11)

Classroom Exercises

1. Suggest an alternative procedure for Construction 7 that uses Constructions 5 and 6.

Describe how you would construct each of the following.



2. The midpoint of $\overline{BC}$
3. The median of $\triangle ABC$ that contains vertex B
4. The altitude of $\triangle ABC$ that contains vertex B
5. The altitude of $\triangle ABC$ that contains vertex A
6. The perpendicular to $\overline{BC}$ at C
7. A square whose sides each have length AC
8. A square whose perimeter equals AC
9. A right triangle with hypotenuse and one leg equal to AC and BC, respectively
10. A triangle whose sides are in the ratio $1:2:\sqrt{5}$