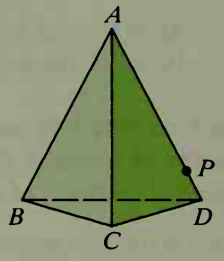
17. Points R, S, and T are noncollinear points.

- **a.** State the postulate that guarantees the existence of a plane X that contains R, S, and T.
- **b.** Draw a diagram showing plane X containing the noncollinear points R, S, and T.
- **c.** Suppose that P is any point of $\overleftrightarrow{RS}$ other than R and S. Does point P lie in plane X? Explain.
- **d.** State the postulate that guarantees that $\overleftrightarrow{TP}$ exists.
- **e.** State the postulate that guarantees that $\overleftrightarrow{TP}$ is in Plane X.

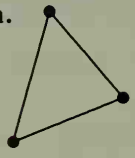
18. Points A, B, C, and D are four noncoplanar points.



- **a.** State the postulate that guarantees the existence of planes ABC, ABD, ACD, and BCD.
- **b.** Explain how the Ruler Postulate guarantees the existence of a point P between A and D.
- **c.** State the postulate that guarantees the existence of plane BCP.
- **d.** Explain why there are an infinite number of planes through $\overline{BC}$.

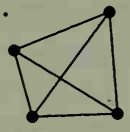
C **19.** State how many segments can be drawn between the points in each figure. No three points are collinear.

a.



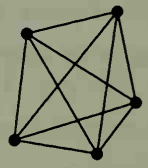
3 points
? segments

b.



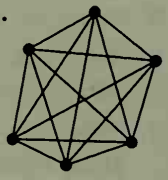
4 points
? segments

c.



5 points
? segments

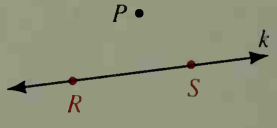
d.



6 points
? segments

- **e.** Without making a drawing, predict how many segments can be drawn between seven points, no three of which are collinear.
- **f.** How many segments can be drawn between n points, no three of which are collinear?

20. Parts (a) through (d) justify Theorem 1-2: Through a line and a point not in the line there is exactly one plane.



- **a.** If P is a point not in line k, what postulate permits us to state that there are two points R and S in line k?
- **b.** Then there is at least one plane X that contains points P, R, and S. Why?
- **c.** What postulate guarantees that plane X contains line k? Now we know that there is a plane X that contains both point P and line k.
- **d.** There can't be another plane that contains point P and line k, because then *two* planes would contain noncollinear points P, R, and S. What postulate does this contradict?