Synthetic Approach

Usually a synthetic approach is best when at least one of the following is true.

1. The lengths of the sides of a figure are given, rather than the coordinates of its vertices.
2. Angle measures other than 90 are given or asked for in the problem. (If lines are parallel or form right angles, however, then a coordinate approach using slopes may be appropriate.)
3. The given information or diagram involves transversals and corresponding angles; congruent lengths, angles, or figures; the areas of similar figures; or the volumes of solids.

Coordinate Approach

1. Usually a coordinate approach is easiest when the problem uses coordinates to name points.
   a. To calculate lengths, use the distance formula.
   b. To locate midpoints, use the midpoint formula.
   c. To show lines are parallel or perpendicular, use the slopes of the lines.
   d. To prove that lines are concurrent, show that their equations have a common solution.
2. Even if a problem does not use coordinates to name points, you can place the coordinate axes on the figure and assign coordinates to the vertices as was shown in Lessons 13-8 and 13-9.
   a. If the figures involved are symmetric, place the axes so that one of them is a line of symmetry. Such a placement reduces the number of variables needed to describe the vertices.
   b. If the figures involved are not symmetric, place the axes so that as many vertices and edges of the figures lie on the x- and y-axes as possible. Distance calculations are simplified whenever zeros appear in the coordinate pairs.

Transformational Approach

1. If the figure has line symmetry, try using a reflection.
2. If the figure has rotational symmetry, try using a rotation.
3. If there are congruent figures placed some distance apart, try using a translation, rotation, glide reflection or a composite of any number of such congruence mappings to map one figure onto the other.
4. If the problem involves similar figures, look for a center of a dilation that would map one figure onto the other. You may first have to rotate one figure so that corresponding sides of similar figures are parallel.
5. If the problem involves calculating the area of an unfamiliar figure, try dissecting the figure and moving the pieces around by transformations until the result is a figure whose area is easy to calculate.
6. Some construction problems can be solved by using reflections (constructing perpendicular bisectors) or by using rotations of angles you can construct, such as 45°, 60°, 90°, or 180°.