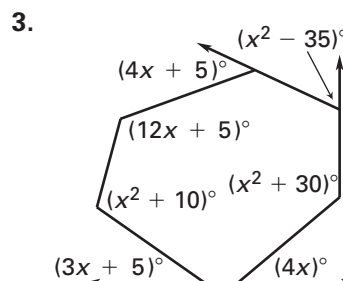
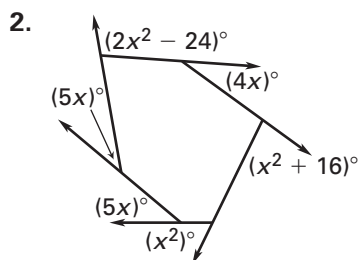
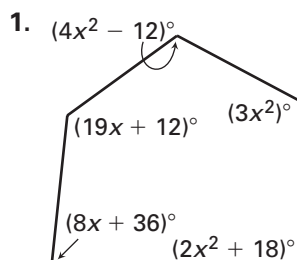


# Challenge: Skills and Applications

For use with pages 661–668

In Exercises 1–3, find the possible values of  $x$ .



4. A convex heptagon has four interior angles that measure  $95^\circ$ ,  $118^\circ$ ,  $146^\circ$ , and  $160^\circ$ , respectively. If the remaining interior angles are congruent, what is the measure of each remaining interior angle?
5. A convex 14-gon has six interior angles that each measure  $164^\circ$ . If the remaining interior angles are congruent, what is the measure of each remaining interior angle?
6. A convex octagon has three exterior angles that measure  $45^\circ$ ,  $65^\circ$ , and  $70^\circ$ , respectively. If the exterior angles at the remaining vertices are congruent, what is the measure of each of these remaining exterior angles?
7. Polygon  $ABCDEFGH$  is a regular nonagon. If  $\overleftrightarrow{BC}$  and  $\overleftrightarrow{FG}$  intersect at point  $K$ , find  $m\angle BKF$ .
8. Polygon  $OPQRSTUVWXYZ$  is a regular dodecagon. If  $\overleftrightarrow{QR}$  and  $\overleftrightarrow{XY}$  intersect at point  $J$ , find  $m\angle QJK$ .
9. Polygon  $EFGHIJKLMN$  is a regular decagon. Find the measure of  $\angle GJM$ , an angle formed by two of the diagonals.

In Exercises 10–13, determine whether the figure must be a regular polygon. If so, write the key steps involved in proving it; otherwise, sketch or describe a counterexample.

10.  $ABCDEF$  is a hexagon in which all sides are congruent, and  $m\angle A = m\angle C = m\angle E = 120^\circ$ .
11.  $GHIJK$  is a pentagon in which all sides are congruent, and  $m\angle H = m\angle I = m\angle J = 108^\circ$ .
12.  $P$  is an  $n$ -gon that is inscribed in a circle, and all sides of  $P$  are congruent.
13.  $Q$  is an  $n$ -gon that is inscribed in a circle, and all interior angles of  $Q$  are congruent.