

### Polygon Worksheet

1. Draw polygons whose interior angles have the given sum of measures.
  - a.  $900^\circ$
  - b.  $1800^\circ$
  - c.  $540^\circ$
2. The interior angles of an  $n$ -gon have average measure  $171^\circ$ .
  - a. What is  $n$ ?
  - b. Imagine your polygon has flexible joints. What happens to the measure of average interior angles if you flex the polygon to reduce the number of interior angles?
3. Draw three different polygons (different number of sides on each), one regular, one convex but not regular, and one concave.
  - a. How many diagonals (non-intersecting) are required to divide each of your polygons into triangles? This is called 'triangulating a polygon'.
  - b. How many triangles are in any triangulation of an  $n$ -gon by diagonals?
  - c. How can you use triangulations of a polygon to "prove" the formula  $(n-2)*180^\circ$  for the sum of the measures of the interior angles of any  $n$ -gon?
4. Consider the star below.
  - a. Find the sum of the angles marked by X. Can you use the total turn theorem to do this?
  - b. What is the measure of the angle in each point of the pentagram created inside the star? Is it regular?

