Problem of the Week
Problem B
This Strikes a Chord

A line segment that has its endpoints on a circle is called a *chord*. The diameter of a circle is a special chord which passes through the centre of the circle.

Two chords can divide a circle in two different ways:

1. non-intersecting chords divide the circle into three pieces, or
2. the two chords can also intersect, giving four pieces.

NOTE: An intersection only refers to chords crossing *inside* the circle, and for this problem, no more than two chords can intersect at one point.

a) Three chords offer more possibilities. What is the maximum number of pieces into which a circle can be divided by three chords?

b) Sketch all the ways a circle can be subdivided by three chords. How is the number of intersections related to the number of pieces?

c) Find all the ways a circle can be subdivided by four chords. Is the number of intersections related to the number of pieces in the same way as in part b)?

d) If you used six chords, what would you predict to be the maximum number of pieces? Explain your reasoning.

**Strands**  Geometry and Spatial Sense, Patterning and Algebra