Worksheet: Four & Twenty Blackbirds

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It may help you to use blackbird tiles or other counters to help you work out these questions.

1. Consider the corner numbers 6, 1, 3 & 2. In how many ways can the birds be arranged with these numbers in the corners? Include all the reflections and rotations.

2. Some solutions have the same number in some corners. Consider the corner numbers 5, 3, 2 & 2. In how many ways can the birds be arranged with these numbers in the corners? Include all the reflections and rotations.

3. In how many ways can the birds be arranged with these numbers in the corners? Include all the reflections and rotations.
   (a) 4, 4, 2 & 2 (b) 6, 2, 2 & 2 (c) 3, 3, 3 & 3

4. Suppose the Queen only counted 8 along each side. This creates a new problem. What is the sum of the corner numbers this time? Find at least four solutions.

5. Suppose the Queen only counted 7 along each side. This creates a new problem. What is the sum of the corner numbers this time? Find at least four solutions.

6. Suppose the Queen only counted 6 along each side. This creates a new problem. What is the sum of the corner numbers this time? Find all the solutions.

7. The King redesigned the Royal Garden so that there were three sides and not four. Suppose all 24 birds arranged themselves with 9 to each side of the triangle. How many solutions are there? How do you know when you have found them all?