Searching for Patterns – Identity Elements

1. Look at the triangles that you have colored so far. Do you see any inverted solid triangles? Do all of the triangles that you colored have solid inverted triangles? Are the inverted triangles all the same color?

2. What color(s) appear as solid inverted triangles? What number(s) correspond to the solid inverted triangles? Does your answer depend on which colored triangle you are looking at?

3. Explain why you think the solid inverted triangles appear in the colored triangles.

4. Look along the outside edges of the solid inverted triangles. Describe what you see happening and explain why you think this occurs.

TEACHER NOTES: In this exercise the students will be discovering the identity element 0 of $\mathbf{Z_n}$. Solid inverted triangles appear in every colored triangle. The color of the inverted triangles will correspond to the number 0. These triangles occur since 0 + 0 = 0. The same color will appear along the outside edge of an inverted triangle since $a + 0 = 0 + a = a$.