# Answer Key

1. **Step 1:**

   $s_1 = \sum_{i=1}^{1}(3i^2) = 3(1)^2 = 3$

   **Step 2:**

   $s_n = s_{n-1} + 3n^2$

   **Solution:**

   $s_1 = 3$ $\qquad\qquad\qquad\qquad s_n = s_{n-1} + 3n^2$

2. **Step 1:** $s_1 = \sum_{i=1}^{1}(2^{i-1} + 1) = 2^0 + 1 = 2$

   **Step 2:** $s_n = s_{n-1} + 2^{n-1} + 1$

   **Solution:** $s_1 = 2$ $\qquad\qquad\qquad s_n = s_{n-1} + 2^{n-1} + 1$

3. **Step 1:** $D(m) = 2m$

   **Step 2:** $D(1) = 2(1) = 2$ ✓

   **Step 3:** $D(m-1) = 2(m-1) = 2m - 2$

   **Step 4:** $D(m-1) = 2m - 2$

   **Step 5:** $D(m-1) = D(m) - 2$

   **Step 6:** $D(m) = D(m-1) + 2$

   **Step 7:** $D(m) = 2k + 2$

   **Step 8:** $D(m) = 2(k+1)$

4. **Step 1:** $D(m) = 4m + 1$

   **Step 2:** $D(1) = 4(1) + 1 = 5$ ✓

   **Step 3:** $D(m-1) = 4(m-1) + 1 = 4m - 4 + 1$

   **Step 4:** $D(m-1) = (4m + 1) - 4$

   **Step 5:** $D(m-1) = D(m) - 4$

   **Step 6:** $D(m) = D(m-1) + 4$

   **Step 7:** $D(m) = (2k + 1) + 4 = 2k + 4 + 1$

   **Step 8:** $D(m) = 2(k+2) + 1$

5. **Step 1:** $D(m) = m^2 - m$

   **Step 2:** $D(1) = 1^2 - 1 = 0$ ✓

   **Step 3:** $D(m-1) = (m-1)^2 - (m-1) = m^2 - 2m + 1 - m + 1$

**Step 4:** $D(m-1) = (m^2 - m) - 2m + 2$

**Step 5:** $D(m-1) = D(m) - 2m + 2$

**Step 6:** $D(m) = D(m-1) + 2m - 2$

**Step 7:** $D(m) = 2k + 2m - 2$

**Step 8:** $D(m) = 2(k + m - 1)$