

$$\left( \text{Diagram 1} \right)^2 = 4 \text{Diagram 2} - 8 \text{Diagram 3} + 4 \text{Diagram 4}$$

$$= 8 \text{Diagram 5} + 8 \text{Diagram 6} - 8 \text{Diagram 7} - 16 \text{Diagram 8} - 8 \text{Diagram 9} + 16 \text{Diagram 10}$$

The diagrams are as follows:

- Diagram 1:** A vertical loop with two white nodes connected by a vertical line, and a black node connected to the top white node.
- Diagram 2:** A vertical loop with two white nodes. The top white node is connected to an orange node, and the bottom white node is connected to a green node.
- Diagram 3:** A vertical loop with three white nodes. The top two white nodes are connected by an orange line to an orange node, and the bottom two white nodes are connected by a green line to a green node.
- Diagram 4:** Two horizontal loops, each with two white nodes. The top loop is connected to an orange node, and the bottom loop is connected to a green node.
- Diagram 5:** A graph with four black nodes. Two nodes on the left are connected to two nodes on the right by a diagonal line and a vertical line.
- Diagram 6:** A square graph with four black nodes and four edges.
- Diagram 7:** A star graph with a central black node connected to three peripheral black nodes.
- Diagram 8:** A graph with four black nodes. Two nodes on the left are connected to two nodes on the right by a horizontal line and a diagonal line.
- Diagram 9:** A graph with four black nodes. Two nodes on the left are connected to two nodes on the right by a diagonal line and a vertical line.
- Diagram 10:** A graph with four black nodes. Two nodes on the left are connected to two nodes on the right by a horizontal line and a diagonal line.