

Observe that an even number must end in 0,2,4,6, or 8. Now consider 2 cases: numbers ending in 0 respectively numbers ending in 2,4,6, or 8.

When the termination is 0, observe that there are 9 choices for the first digit. Once that digit is chosen, there are 8 choices for the second, then 7, 6, and 5 for the third, fourth, and fifth respectively. We conclude that there are $9 \times 8 \times 7 \times 6 \times 5 = 15,120$ even 6-digit numbers with no repeated digits ending in 0.

In the second case, when the termination is an even digit other than 0 observe that the last digit can be chosen in 4 ways. Once the last digit is chosen, the first digit can be chosen in only 8 ways. Thus notice that the number of choices for the remaining digits are 8,7,6, and 5, to conclude that there are $8 \times 8 \times 7 \times 6 \times 5 \times 4 = 53,760$ even 6-digit numbers with no repeated digits ending in a non-zero digit.

Then add $15,120 + 53,760 = 68,880$ to get the final result.

Any alternative, correct solution earns full credit.