Advanced criteria combinations in the Excel SUMPRODUCT function involve combining multiple logical conditions (criteria) across arrays to sum values that meet all or some of these conditions simultaneously. The core idea is to use criteria expressions that return arrays of TRUE/FALSE values, which are coerced into 1s and 0s by multiplication (for AND logic) or addition (for OR logic), and then multiply these with the array of numbers you want to sum.

Key Concepts and Techniques
Basic Multiple Criteria (AND logic)
The formula multiplies the conditions to select rows that meet all criteria:

text
=SUMPRODUCT((array1 = criteria1) * (array2 = criteria2) * values_array)
Each condition (arrayX = criteriaX) returns an array of TRUE/FALSE, which is converted to 1/0 by multiplication. Only rows where all conditions are true (111=1) contribute their corresponding value to the sum.

Using Double Unary (--) to Convert TRUE/FALSE Explicitly
Alternatively, replace multiplication with commas and apply -- to coerce booleans:

text
=SUMPRODUCT(--(array1=criteria1), --(array2=criteria2), values_array)
This works the same but can sometimes improve readability or avoid issues.

Mixing AND and OR logic

AND conditions multiply.

OR conditions sum arrays and test if > 0 (i.e., any criterion is true). For example, to sum values where array1 equals "A" OR "B":

text
=SUMPRODUCT(((array1="A") + (array1="B")) * (array2=criteria2) * values_array)
The plus sign (+) works like OR, so if either condition is true, the sum is included.

Inequality and Range Criteria
You can include conditions like greater than, less than:

text
=SUMPRODUCT((array1>10) * (array2<20) * values_array)
Dynamic Criteria Using Cell References
Substitute criteria with cell references:

text
=SUMPRODUCT((array1=A1) * (array2=B1) * values_array)

Handling Optional Criteria (e.g., Ignore if "All")
You can use conditional logic inside SUMPRODUCT to ignore a criterion if a certain condition is met:

text
```
=SUMPRODUCT(
   (array1 = IF(criteria1="All", array1, criteria1)) *
   (array2 = IF(criteria2="All", array2, criteria2)) *
   values_array
)
```
This way, if a criteria cell contains "All", that criterion is ignored.

Examples

Sum sales made by John in North region in Q1:

text
```
=SUMPRODUCT((SalesRep="John")*(Region="North")*(Quarter=1)*SalesAmount)
```
Sum values where Category is A or B, and Status is "Open":

text
```
=SUMPRODUCT(((Category="A")+(Category="B"))*(Status="Open")*Amount)
```
Sum where conditions use inequalities and referenced criteria:

text
```
=SUMPRODUCT((Date>=StartDate)*(Date<=EndDate)*(Item=SelectedItem)*Amount)
```
Advantages
Works without needing helper columns or array formulas entered with Ctrl+Shift+Enter.

Can handle multiple criteria across multiple columns and complex logical conditions.

Tips
Always enclose criteria expressions in parentheses.

Multiplication (*) means AND logic, addition (+) means OR logic.

Use -- or multiplication for coercing TRUE/FALSE to 1/0.

Be careful with blank or text criteria; test to ensure correct logical evaluation.

If interested, I can also provide example Excel formulas tailored for your dataset or share a small workbook template illustrating advanced SUMPRODUCT criteria combinations.

References:

MyExcelOnline: Advanced SUMPRODUCT with multiple criteria

Ablebits: SUMPRODUCT multiple criteria examples

Microsoft Support: SUMPRODUCT function details

YouTube tutorial on SUMPRODUCT and multiple criteria