# ⑧ plot raw data

Signal factor: die size

1）look at the graph of L1 to L18

2）What is your ideal?

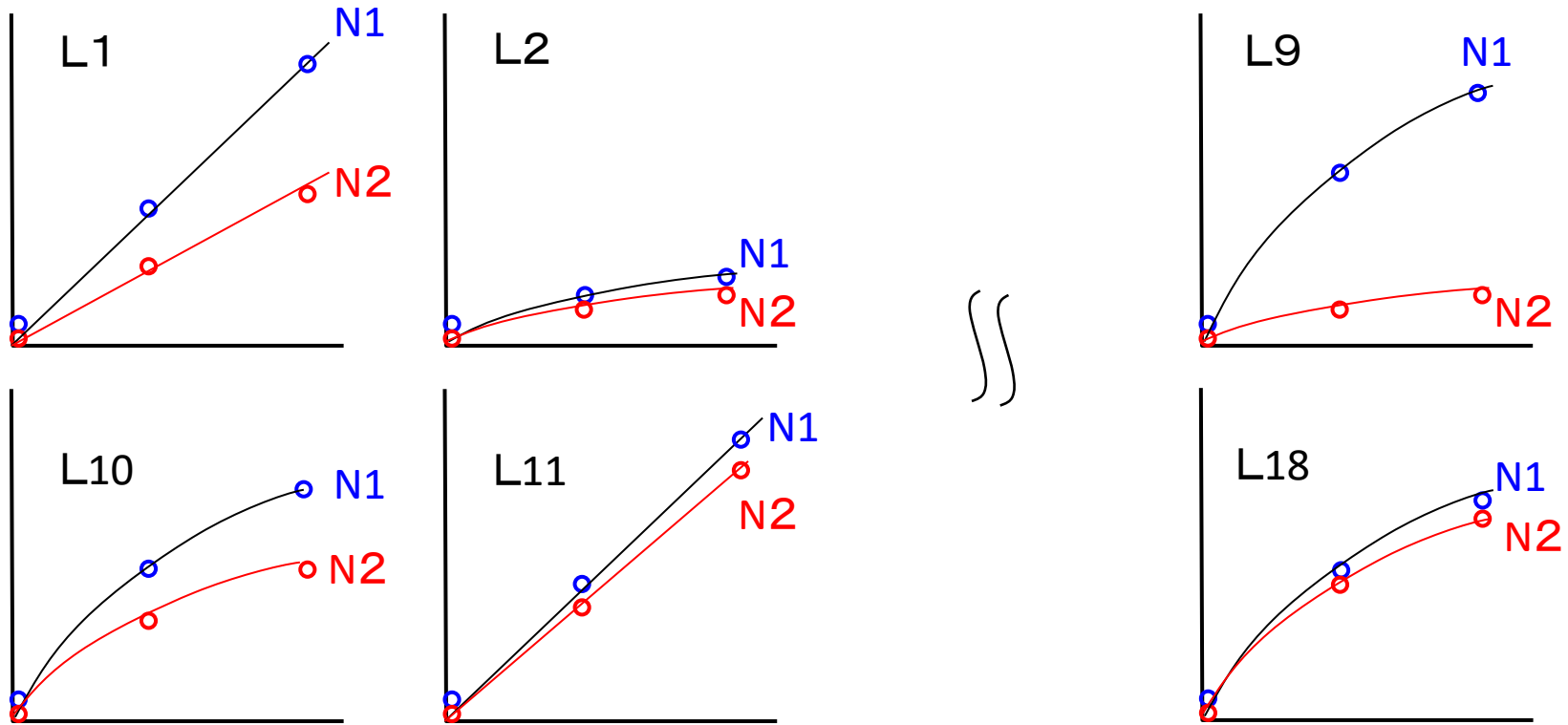3）slect a few that are close to your ideal
Select 2-3 items far from ideal

4）Is the SN ratio that is close to the ideal graph more larger?   Is the SN ratio of graph which is far from ideal more smaller ?   →If not, review the SN ratio calculation formula.

5）If they match, create a graph of factorial effects
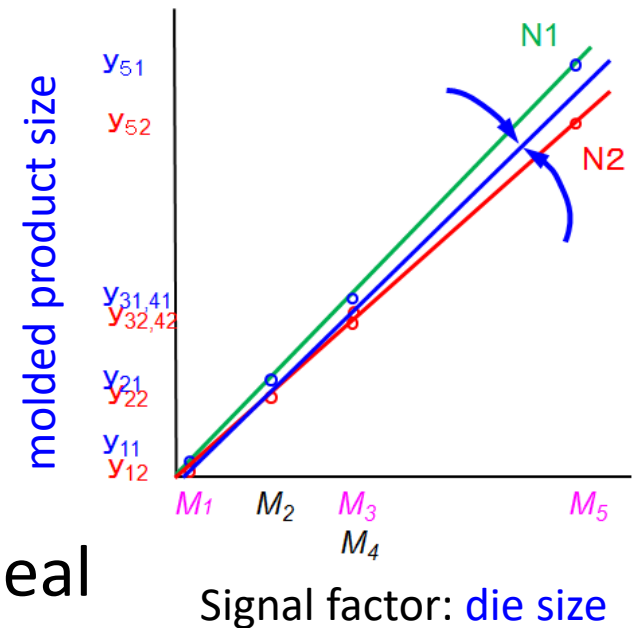
⑧ Raw data plotting

2）Calculate the SN ratio η and the sensitivity S from the data using the SN ratio formula

3）Select a graph that you think has good characteristics and confirm that it matches the calculated SN ratio. Select a graph that you think has poor characteristics and confirm that it matches the calculated SN ratio.
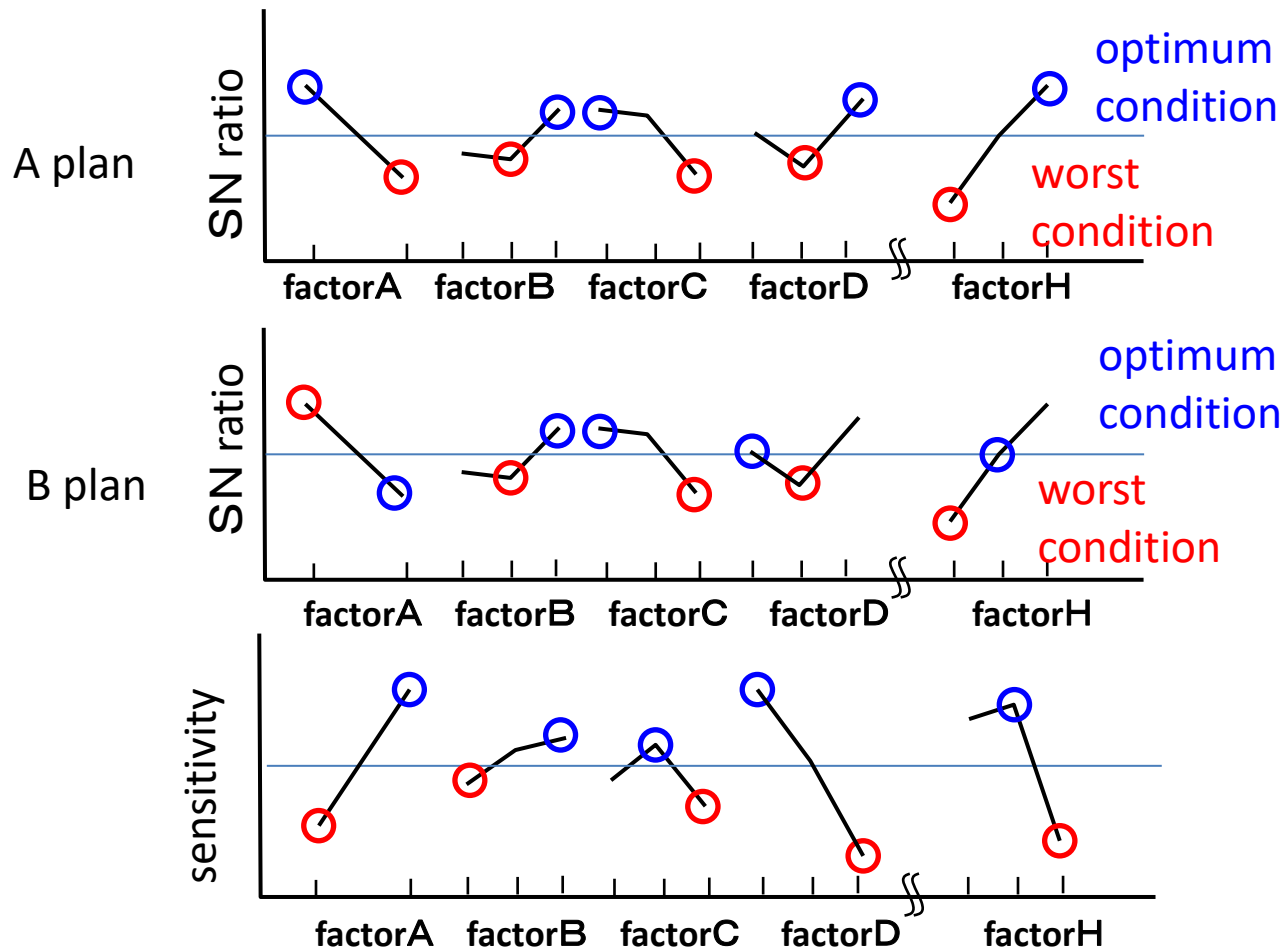
example   large SN ratio   : L11 L18 L2   small SN ratio： L1 L9 L10

               straight line with high sensitivity： L11   those with low sensitivity： L2

⑨A graph of factorial effects

A plan

SN ratio

optimum condition

worst condition

factorA factorB factorC factorD factorH

B plan

SN ratio

optimum condition

worst condition

factorA factorB factorC factorD factorH

sensitivity

factorA factorB factorC factorD factorH

There are some pattern that priority may be given to SN ratio with sacrificing sensitivity or priority may be given to sensitivity with sacrificing SN ratio.

⑨draw a "graph of factorial effects"

## Calculate the SN ratio for each level of A～H control factor

No.	control factor								SN ratio
	A	B	C	D	E	F	G	H	(db)
1	1	1	1	1	1	1	1	1	34.73
2	1	1	2	2	2	2	2	2	55.31
3	1	1	3	3	3	3	3	3	55.87
4	1	2	1	1	2	2	3	3	57.65
5	1	2	2	2	3	3	1	1	55.58
6	1	2	3	3	1	1	2	2	48.93
7	1	3	1	2	1	3	2	3	55.49
8	1	3	2	3	2	1	3	1	50.42
9	1	3	3	1	3	2	1	2	38.61
10	2	1	1	3	3	2	2	1	49.05
11	2	1	2	1	1	3	3	2	51.08
12	2	1	3	2	2	1	1	3	51.69
13	2	2	1	2	3	1	3	2	48.21
14	2	2	2	3	1	2	1	3	55.31
15	2	2	3	1	2	3	2	1	57.57
16	2	3	1	3	2	3	1	2	53.10
17	2	3	2	1	3	1	2	3	53.06
18	2	3	3	2	1	2	3	1	52.82

average of 9 data

average of 6 data

factor		1	2	3	average 4
A		50.288	52.430	—	51.359
B		49.619	53.873	50.583	51.359
C		49.702	53.459	50.915	51.359
D		48.781	53.182	52.113	51.359
E		49.725	54.288	50.063	51.359
F		47.839	51.457	54.781	51.359
G		48.169	53.232	52.675	51.359
H		50.027	49.205	54.843	51.359
					51.359

Overall average

Check that everything is the same

⑨draw a "graph of factorial effects"

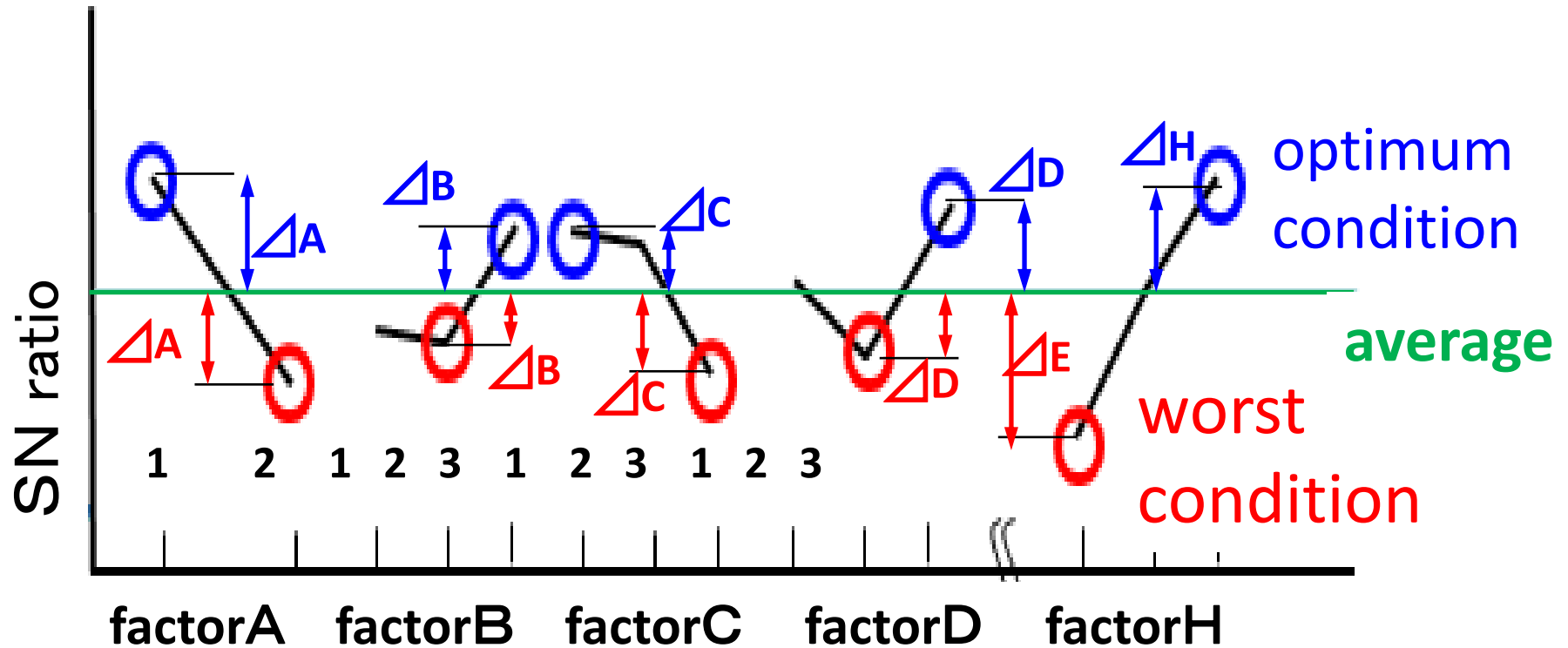select optimum condition and worst condition
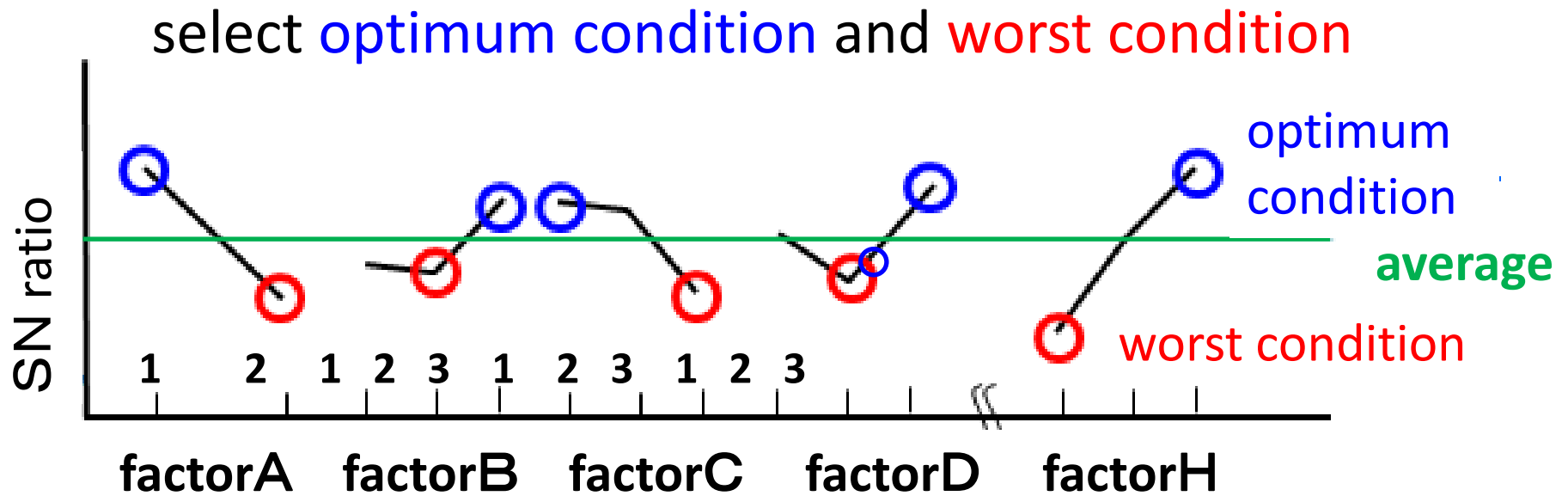
1）Is the **average value** correct?
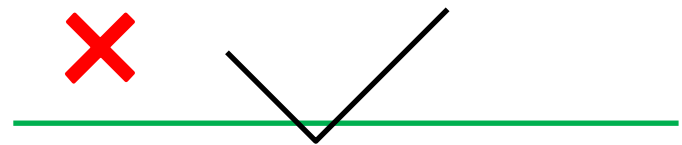
2）Mark 〇 (high levels of SN ratio) and 〇 (low levels of SN ratio)

3）optimum condition → **A1B3C1D3・・・・・**
　　worst condition → **A2B2C3D2・・・・・・**

⑩calculate the estimated gain

gain＝（optimum condition　**sum of deviation from mean**）
　　　　　－（worst condition　**sum of deviation from mean**）
　　＝（△A+ △B+ △C+ △D+・・・+△H)
　　　　　－（△A+ △B+ △C+ △D+・・・+△H)

⑩confirming experiment

make sample
 under optimum condition and
 worst condition
↓
calculate SN ratio
↓
calculate the confirmed gain