3.1% conversion. Plus or minus what?

D8A.ACADEMY/RESOURCES/CONFIDENCE-INTERVALS

WHAT 95% MEANS

[2.7%, 3.5%]	from 248 of 8,000. point: 3.1%
95%	of such brackets catch the true rate
this bracket	← holds or not. no 95% about it

WIDTH

n = 8,000	± 0.4 pt: [2.7, 3.5]
n = 500	± 1.5 pt: [1.6, 4.6]
4x the n	← half the width. not a quarter

TWO OF THEM

overlap	A and B overlap: can still differ
B minus A	one bracket on the difference

WORTH MEMORIZING

01 The bracket, six lines

Normal approximation. Fine when the successes and the failures are both above 10.

```
import math
conv, n = 248, 8_000
p = conv / n                          # 0.031
se = math.sqrt(p * (1 - p) / n)       # 0.0019
lo, hi = p - 1.96 * se, p + 1.96 * se
print(f'{p:.1%} [{lo:.1%}, {hi:.1%}]')
# 3.1% [2.7%, 3.5%]
```

→ Report the point, the bracket and the n, in that order, every time: 3.1% [2.7, 3.5], n = 8,000. The bracket is the part people argue with.

02 Trap: three readings of a bracket

Each one gets said in readouts. Two are wrong, one is lazy.

YOU SEE	YOU SAY	SAY INSTEAD
A [2.7, 3.5] B [3.4, 4.2]	they overlap, no difference	B minus A: +0.7 [0.1, 1.3]
[2.7, 3.5]	95% chance the rate is in there	the method is right 95 times in 100
n = 500: [1.6, 4.6]	3.1% conversion	3.1%, between 1.6 and 4.6

→ Overlap is not a test. Compute the bracket on the difference: if it excludes zero, B is ahead, overlap or not.