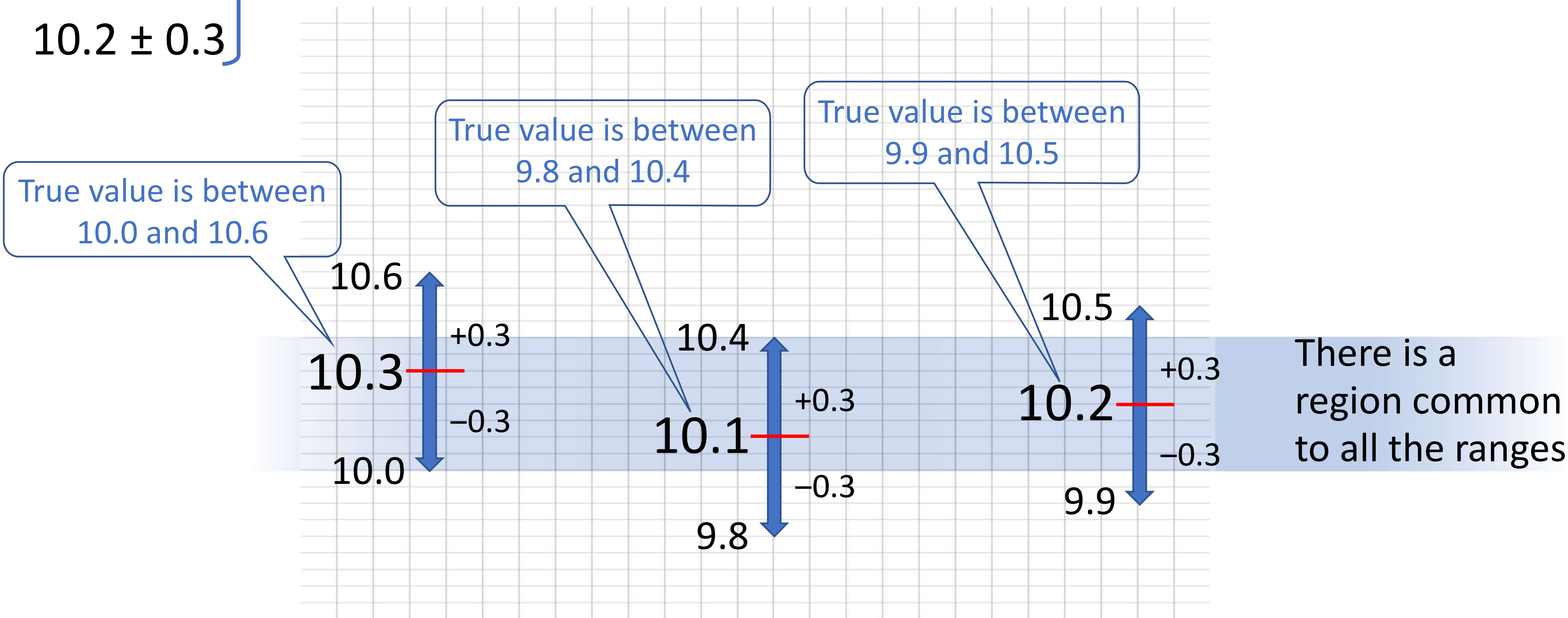
10.3 ± 0.3
10.1 ± 0.3
10.2 ± 0.3

Are these measurements reported with appropriate precision?



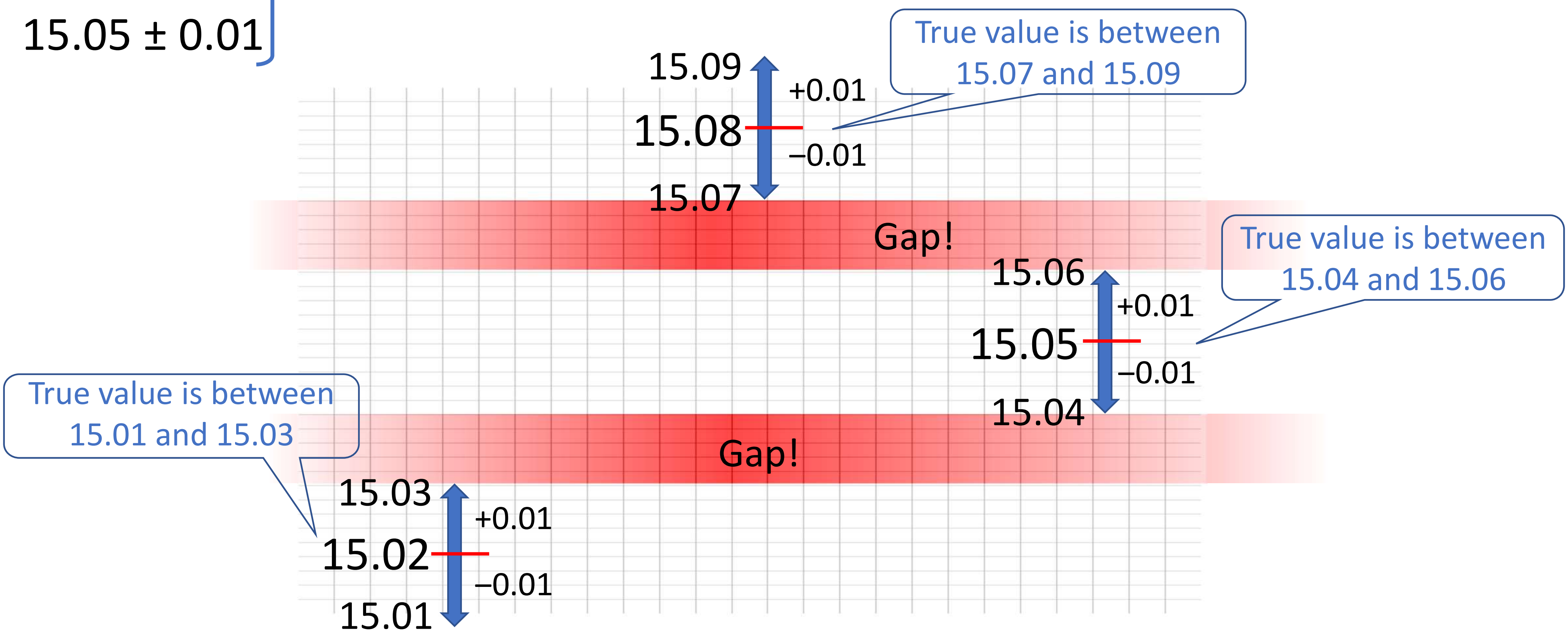
Yes.

Because the ranges implied by their uncertainties (“error bars”) overlap, making them “consistent enough” with one another.

Their “claims” are not incompatible.

15.02 ± 0.01
15.08 ± 0.01
15.05 ± 0.01

Are these measurements reported with appropriate precision?



No!

Because the ranges implied by their uncertainties ("error bars") do not overlap, making them **not** "consistent enough" with one another. Their "claims" are incompatible.

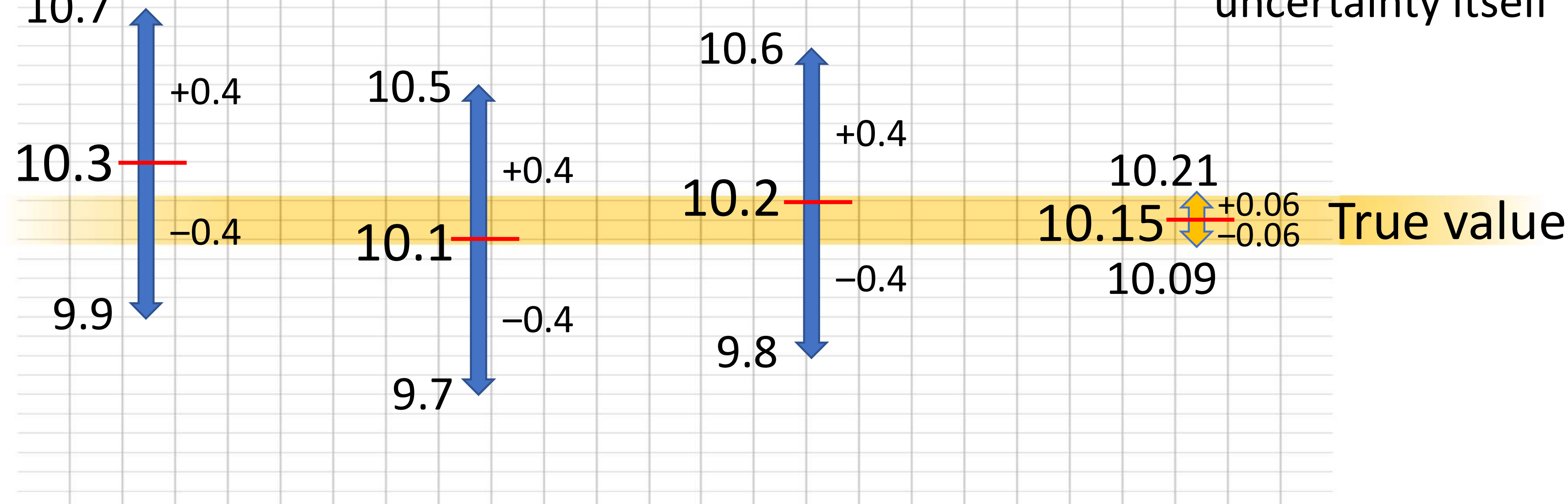
10.3 ± 0.4

10.1 ± 0.4 } Are these measurements accurate?

10.2 ± 0.4

Given the true value*:
10.15 ± 0.06

*The "true value" is the best, accepted value, and has experimental uncertainty itself



Yes.

Because the ranges implied by their uncertainties ("error bars") overlap with the uncertainty range of the true value. Therefore:

Their claims agree with the true value, according to the claimed uncertainties.

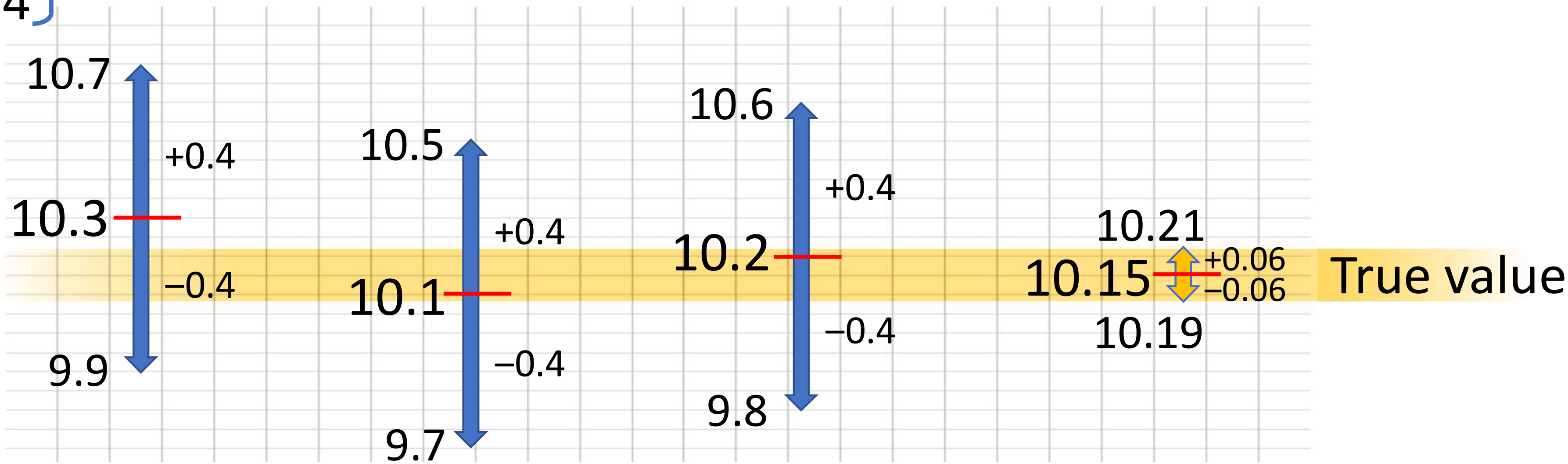
10.3 ± 0.4

10.1 ± 0.4

10.2 ± 0.4

Are these measurements precise?

Given the true value:
10.15 ± 0.06



No. Because their uncertainties ("error bars") are significantly larger than the uncertainty of the true value.

What "significantly" means still leaves some ambiguity.

<u>For our purposes, in this course</u>:

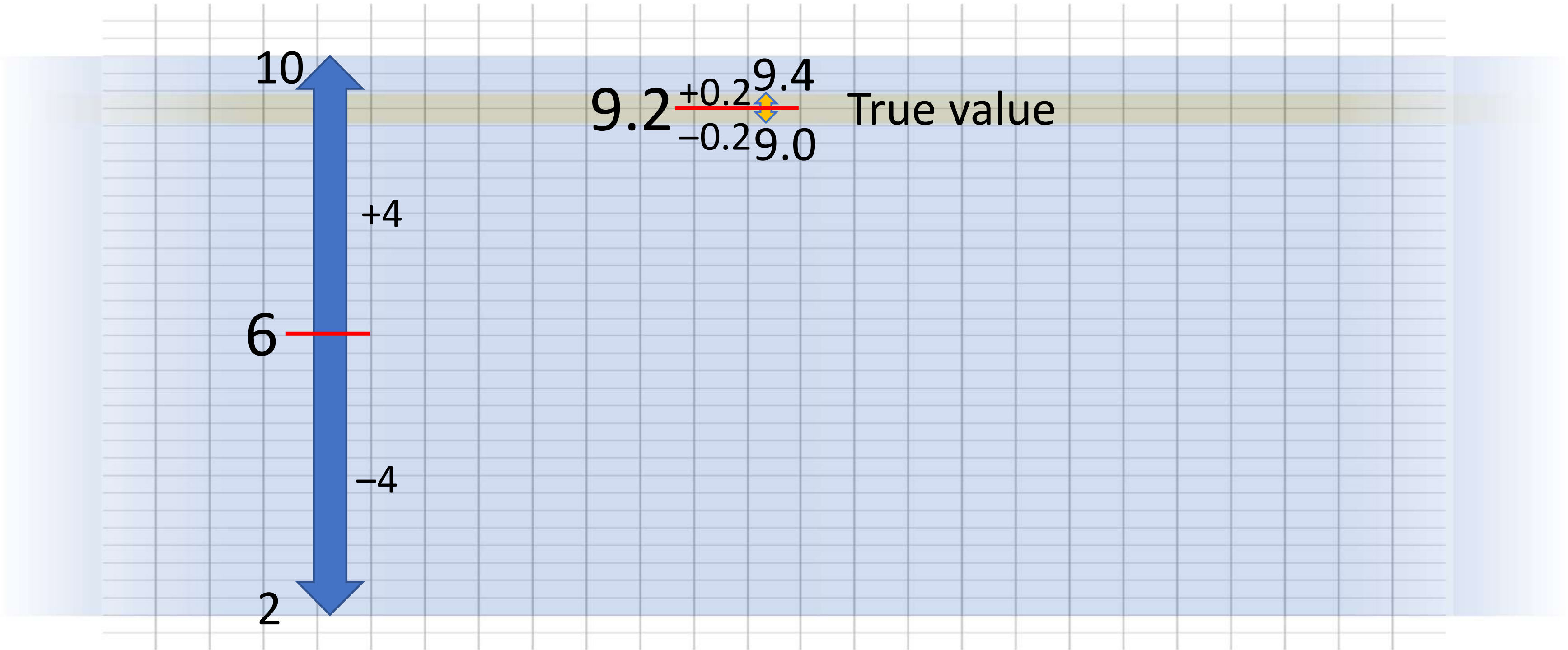
If the measurement's uncertainty is more than five times that of the true value, we will consider it "not precise". Otherwise, we will consider it "precise".

In any case, *our questions will involve much bigger differences*.

Low precision can allow a measurement to be technically “accurate”

6 ± 4 Is this measurement accurate?

Given the true value:
9.2 ± 0.2



Yes.

Because the range of values compatible with the measurement is wide, and includes the true value.

It may not “feel” accurate, but it is technically “accurate”.