1-sample
t-interval
&
t-test

Conditions:

- Random Sample

- 10% condition

- Sample size/Normality:

- *Normal population?*
- *n > 30? (dist. of x-bar roughly normal by CLT)*
- *Check graph of sample data ("normality is plausible for the population")*

$$df = n - 1$$

df = n – 1

Define μ ("true mean…")

1-sample t-interval:

$$\bar{x} \pm t^*_{df} \times \frac{s}{\sqrt{n}}$$

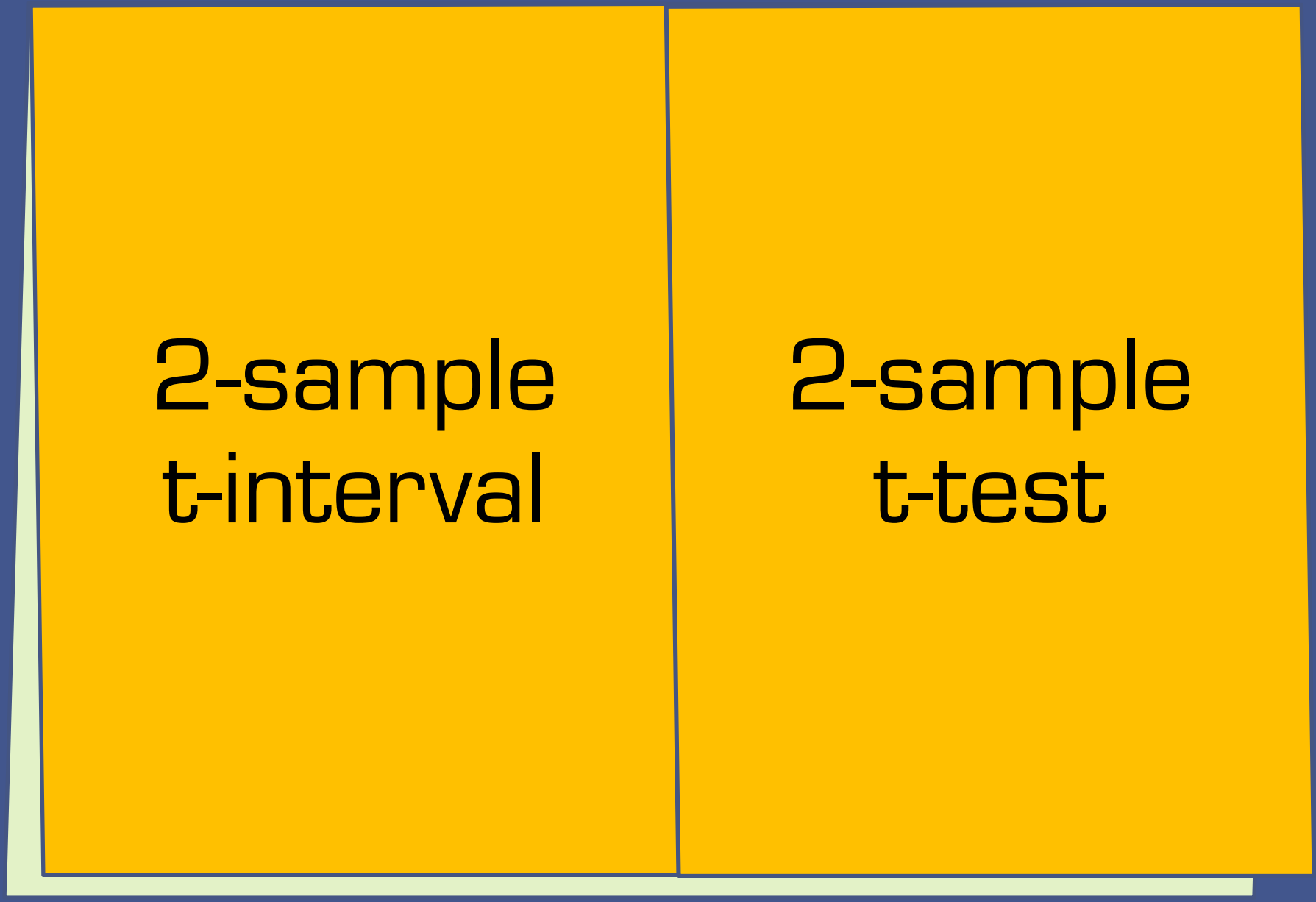
1-sample t-test:

$$H_O : \mu = \mu_0$$

$$H_A : \mu \overset{>}{\underset{\neq}{<}} \mu_0$$

$$t = \frac{\bar{x} - \mu}{s / \sqrt{n}}$$

Update your foldables (outside, MIDDLE 2 flaps)



Define μ_1 and μ_2... ("true mean...")

Conditions:

- ***Random Samples***
- ***Independent Groups***
- ***10%***
- ***Nearly Normal Condition***
  - *populations are normally distributed*
  - *n > 30 (for EACH group! not combined!)*
  - *Graph **BOTH** sets of data (outliers?)*

For a randomized experiment:
Check for RANDOM ASSIGNMENT of subjects to treatment groups

df = **use calculator**

Update your foldables (inside, bottom half)

2-sample t-interval:

statistic ± crit. value × standard error

$$(\bar{x}_1 - \bar{x}_2) \pm t^*_{df} \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

INTERPRET THE INTERVAL:
"We are ___% confident that the true difference in mean _____ is between _____ and _____."

INTERPRET THE CONF. LEVEL:
"If we repeat this method MAAANY times, about ___% of the resulting intervals will contain the true difference in the mean... _____."

2-sample t-test:

$$H_O: \mu_1 - \mu_2 = 0$$

$$H_A: \mu_1 - \mu_2 \gtrless 0 \neq$$

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - 0}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

Last flap of our "means" foldable (outside)

matched pairs!

paired *t*-interval

and

paired *t*-test

Update your foldables (inside, top half)

Define μ_d *("true mean difference…")*

***define which way you are subtracting!!!

Conditions:

- ***Paired data???***
- ***Random sample (pairs)***
- ***10% Condition***
- ***Nearly Normal Condition***
  - *n > 30 (number of PAIRS!!!)*
  - *boxplots/histogram* ***of DIFFERENCES!!!***

***do **NOT** graph BOTH boxplots!!!

So we may use a t-distribution,

df = n – 1 ("n" is the number of ***pairs****)*

Update your foldables (inside, bottom half)

on calculator, just do "*t*-test" or "*t*-interval" **with the <u>differences</u>**

paired t-interval:

$$\bar{x}_d \pm t^*_{df}\left(s_d/\sqrt{n_d}\right)$$

paired t-test:

$$H_O\colon \mu_d = 0$$

$$H_A\colon \mu_d \overset{>}{\underset{\neq}{<}} 0$$

$$t = \frac{\bar{x}_d - 0}{s_d/\sqrt{n_d}}$$