10.2 Comparing 2 Means

Notation:

	Population 1	Population 2
true means	μ_1	μ_2
sample means	$\bar{x}_1$	$\bar{x}_2$
sample sizes	n_1	n_2
sample st. dev.	s_1	s_2

use $\bar{x}_1 - \bar{x}_2$ to estimate $\mu_1 - \mu_2$

More info on the sampling distribution $(\mu_1 - \mu_2)$ on p 631

Conditions for 2-Sample procedures for means

1. Random - both samples must be randomly selected (for an experiment the treatments should be randomly assigned)
2. Normal - either:
   - populations are Normal
   - $n_1 \geq 30$ & $n_2 \geq 30$
   - no outliers or strong skewness on both graphs
3. Independent - 2 samples should be independent of each other and the 10% condition should be met for each.

Confidence Intervals for 2 means

name of Method: 2 sample t interval for a difference between 2 means

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

on Calc: Stat → tests → 0: 2-SampTInt

★ Never pool with means. (only proportions)

2 sample t procedures are more robust than 1 sample

ex:

$\boxed{\text{Step 1}}$: μ_T = the true mean capacity of grocery bags from Target

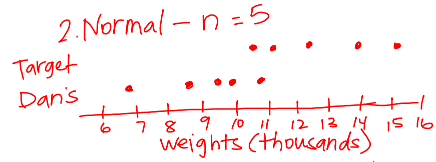
μ_D = " " " " " " bags from Dan's

C-level: 99%

$\boxed{\text{Step 2}}$: use a 2-Sample T Interval for a difference of means $(\mu_T - \mu_D)$

Conditions: 1. Random — Random sample of 5 bags was chosen from each store.

2. Normal — n = 5



No extreme outliers or strong skewness so we're safe to proceed.

3. Independent: 2 samples were taken independently

there are more than 50 bags at each store.

$\boxed{\text{Step 3}}$ on calculator:

(-101, 7285)

df = 7.5

$\boxed{\text{Step 4}}$ We are 99% confident that the interval (-101, 7285) captures the true mean difference $(\mu_T - \mu_D)$ in capacity of grocery bags from Target and Dan's.