

### 10.2b Significance Tests for 2 means

$$H_0: \mu_1 = \mu_2 \quad \text{or} \quad H_0: \mu_1 - \mu_2 = 0$$

method: 2-sample T test for a  
name: difference between 2 means

$$\text{formula: } t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

← usually 0

on calc: 4: 2 Samp T test

example:

$$\text{Step 1} \quad H_0: \mu_B = \mu_G \quad \text{or} \quad H_0: \mu_B - \mu_G = 0$$

$$H_a: \mu_B > \mu_G \quad H_a: \mu_B - \mu_G > 0$$

$$\alpha = 0.05$$

$\mu_B$  = the true mean weight that a Wet Bounty paper towel can hold.

$\mu_G$  = the true mean weight a Wet Generic paper towel can hold.

Step 2

use a 2 sample T test for  $\mu_B - \mu_G$

Conditions: ① Random - 30 paper towels of each brand were selected

② Normal -  $n_1 \geq 30$ ,  $n_2 \geq 30$

③ Independent - there are more than  $10(30) = 300$  paper towels of each brand and 2 samples were taken independently.

Step 3

$$t = 17.65 \quad df = 57.8$$

$$p\text{-value} = 0$$

Step 4

Since our p-value (0) is less than  $\alpha(0.05)$  we reject the Null hypothesis.

We can conclude that on average, Wet Bounty paper towels hold more weight than wet generic paper towels.