10.1

# 2-Proportion (Sample) z Test

This test is used to compare 2 proportions from 2 independent samples

Ex Is the proportion of LN seniors attending college greater than the proportion of LC seniors

## Conditions (Both Samples)

- Random
- Normal Sampling Distributions

$n_1\hat{p}_1 \geq 10$ $\quad$ $n_2\hat{p}_2 \geq 10$

$n_1(1-\hat{p}_1) \geq 10$ $\quad$ $n_2(1-\hat{p}_2) \geq 10$

- Independent

$N_1 > 10n_1$ $\quad$ $N_2 > 10n_2$

# Hypothesis Test

$$Z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

$$\left.\hat{p} = \frac{\text{total \# success in both samples}}{\text{total \# of observations}}\right\} \text{pooled sample proportion}$$

# Confidence Interval

$$CI = (\hat{p}_1 - \hat{p}_2) \pm z^* \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$$

Table B

## 2-PROPORTION Z-TEST

*This test is used to compare proportions from 2 independent samples.*

In s study done in Michigan, it was determined 38 (out of 62) poor children who attended pre-school needed social services later in life compared to 49 (out of 61) poor children who did not attend preschool.

**Does this study provide significant evidence that preschool reduces the need for social services later in life?**

**P) IDENTIFY POPULATION PARAMETERS:** $\left(\hat{p}_1 = \frac{38}{62} = .6129,\ \hat{p}_2 = \frac{49}{61} = .8033\right)$

$p_1$ = proportion of preschooled children needing social services

$p_2$ = proportion of non-preschooled children needing social services

**H) STATE HYPOTHESES:**

$H_0: p_1 = p_2 \quad (H_0: p_1 - p_2 = 0)$

$H_a: p_1 < p_2 \quad (H_a: p_1 - p_2 < 0)$

**A) VERIFY CONDITIONS REQUIRED FOR TEST:**

a) Random

Not known - results may not apply

b) Normal Sampling Distributions

$n_1\hat{p}_1 = (62)\left(\frac{38}{62}\right) = 38 > 10$ ✓ $\qquad n_2\hat{p}_2 = (61)\left(\frac{49}{61}\right) = 49 > 10$ ✓

$n_1(1-\hat{p}_1) = (62)\left(\frac{24}{62}\right) = 24 > 10$ ✓ $\qquad n_2(1-\hat{p}_2) = (61)\left(\frac{12}{61}\right) = 12 > 10$ ✓

c) Independent

$N_1 > 10n_1 > 10(62) > 620$ poor MI children in preschool?

$N_2 > 10n_2 > 10(61) > 610$ poor MI children not in preschool?

**T) PERFORM TEST USING**

**a) TABLE A:**

Calculate z-statistic and check Table:

$$\hat{p} = \frac{\text{total number of successes in both samples}}{\text{total number of observations in both samples}} = \frac{38+49}{62+61} = .7073$$

$$z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})(\frac{1}{n_1}+\frac{1}{n_2})}} = \frac{.6129 - .8033}{\sqrt{(.7073)(.2927)\left(\frac{1}{62}+\frac{1}{61}\right)}} = -2.32$$

$P$-value = .0102 > Table A

[normalcdf (−10, −2.32) ≈ .0102]

**b) CALCULATOR:**

$\boxed{\text{STAT}}$ → TESTS → 2PropZTest

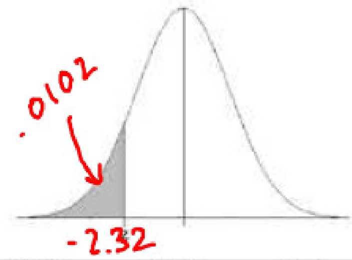
z = −2.32

p = .0102

**S) STATE CONCLUSION:**

At $\alpha = .05$, we have evidence to reject $H_0$ and conclude that preschooling poor children reduces the need for social services later in life

## Standard Normal Cumulative Probability Table




**Cumulative probabilities for NEGATIVE z-values are shown in the following table:**

| z | 0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 |
|---|---|---|---|---|---|---|---|---|---|---|
| -3.4 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0002 |
| -3.3 | 0.0005 | 0.0005 | 0.0005 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0003 |
| -3.2 | 0.0007 | 0.0007 | 0.0006 | 0.0006 | 0.0006 | 0.0006 | 0.0006 | 0.0005 | 0.0005 | 0.0005 |
| -3.1 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0008 | 0.0008 | 0.0008 | 0.0008 | 0.0007 | 0.0007 |
| -3.0 | 0.0013 | 0.0013 | 0.0013 | 0.0012 | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0010 |
| -2.9 | 0.0019 | 0.0018 | 0.0018 | 0.0017 | 0.0016 | 0.0016 | 0.0015 | 0.0015 | 0.0014 | 0.0014 |
| -2.8 | 0.0026 | 0.0025 | 0.0024 | 0.0023 | 0.0023 | 0.0022 | 0.0021 | 0.0021 | 0.0020 | 0.0019 |
| -2.7 | 0.0035 | 0.0034 | 0.0033 | 0.0032 | 0.0031 | 0.0030 | 0.0029 | 0.0028 | 0.0027 | 0.0026 |
| -2.6 | 0.0047 | 0.0045 | 0.0044 | 0.0043 | 0.0041 | 0.0040 | 0.0039 | 0.0038 | 0.0037 | 0.0036 |
| -2.5 | 0.0062 | 0.0060 | 0.0059 | 0.0057 | 0.0055 | 0.0054 | 0.0052 | 0.0051 | 0.0049 | 0.0048 |
| -2.4 | 0.0082 | 0.0080 | 0.0078 | 0.0075 | 0.0073 | 0.0071 | 0.0069 | 0.0068 | 0.0066 | 0.0064 |
| -2.3 | 0.0107 | 0.0104 | 0.0102 | 0.0099 | 0.0096 | 0.0094 | 0.0091 | 0.0089 | 0.0087 | 0.0084 |
| -2.2 | 0.0139 | 0.0136 | 0.0132 | 0.0129 | 0.0125 | 0.0122 | 0.0119 | 0.0116 | 0.0113 | 0.0110 |
| -2.1 | 0.0179 | 0.0174 | 0.0170 | 0.0166 | 0.0162 | 0.0158 | 0.0154 | 0.0150 | 0.0146 | 0.0143 |
| -2.0 | 0.0228 | 0.0222 | 0.0217 | 0.0212 | 0.0207 | 0.0202 | 0.0197 | 0.0192 | 0.0188 | 0.0183 |
| -1.9 | 0.0287 | 0.0281 | 0.0274 | 0.0268 | 0.0262 | 0.0256 | 0.0250 | 0.0244 | 0.0239 | 0.0233 |
| -1.8 | 0.0359 | 0.0351 | 0.0344 | 0.0336 | 0.0329 | 0.0322 | 0.0314 | 0.0307 | 0.0301 | 0.0294 |
| -1.7 | 0.0446 | 0.0436 | 0.0427 | 0.0418 | 0.0409 | 0.0401 | 0.0392 | 0.0384 | 0.0375 | 0.0367 |
| -1.6 | 0.0548 | 0.0537 | 0.0526 | 0.0516 | 0.0505 | 0.0495 | 0.0485 | 0.0475 | 0.0465 | 0.0455 |
| -1.5 | 0.0668 | 0.0655 | 0.0643 | 0.0630 | 0.0618 | 0.0606 | 0.0594 | 0.0582 | 0.0571 | 0.0559 |
| -1.4 | 0.0808 | 0.0793 | 0.0778 | 0.0764 | 0.0749 | 0.0735 | 0.0721 | 0.0708 | 0.0694 | 0.0681 |
| -1.3 | 0.0968 | 0.0951 | 0.0934 | 0.0918 | 0.0901 | 0.0885 | 0.0869 | 0.0853 | 0.0838 | 0.0823 |
| -1.2 | 0.1151 | 0.1131 | 0.1112 | 0.1093 | 0.1075 | 0.1056 | 0.1038 | 0.1020 | 0.1003 | 0.0985 |
| -1.1 | 0.1357 | 0.1335 | 0.1314 | 0.1292 | 0.1271 | 0.1251 | 0.1230 | 0.1210 | 0.1190 | 0.1170 |
| -1.0 | 0.1587 | 0.1562 | 0.1539 | 0.1515 | 0.1492 | 0.1469 | 0.1446 | 0.1423 | 0.1401 | 0.1379 |
| -0.9 | 0.1841 | 0.1814 | 0.1788 | 0.1762 | 0.1736 | 0.1711 | 0.1685 | 0.1660 | 0.1635 | 0.1611 |
| -0.8 | 0.2119 | 0.2090 | 0.2061 | 0.2033 | 0.2005 | 0.1977 | 0.1949 | 0.1922 | 0.1894 | 0.1867 |
| -0.7 | 0.2420 | 0.2389 | 0.2358 | 0.2327 | 0.2296 | 0.2266 | 0.2236 | 0.2206 | 0.2177 | 0.2148 |
| -0.6 | 0.2743 | 0.2709 | 0.2676 | 0.2643 | 0.2611 | 0.2578 | 0.2546 | 0.2514 | 0.2483 | 0.2451 |
| -0.5 | 0.3085 | 0.3050 | 0.3015 | 0.2981 | 0.2946 | 0.2912 | 0.2877 | 0.2843 | 0.2810 | 0.2776 |
| -0.4 | 0.3446 | 0.3409 | 0.3372 | 0.3336 | 0.3300 | 0.3264 | 0.3228 | 0.3192 | 0.3156 | 0.3121 |
| -0.3 | 0.3821 | 0.3783 | 0.3745 | 0.3707 | 0.3669 | 0.3632 | 0.3594 | 0.3557 | 0.3520 | 0.3483 |
| -0.2 | 0.4207 | 0.4168 | 0.4129 | 0.4090 | 0.4052 | 0.4013 | 0.3974 | 0.3936 | 0.3897 | 0.3859 |
| -0.1 | 0.4602 | 0.4562 | 0.4522 | 0.4483 | 0.4443 | 0.4404 | 0.4364 | 0.4325 | 0.4286 | 0.4247 |
| 0.0 | 0.5000 | 0.4960 | 0.4920 | 0.4880 | 0.4840 | 0.4801 | 0.4761 | 0.4721 | 0.4681 | 0.4641 |

**CONFIDENCE INTERVAL:**

Construct a ~~95%~~ 90% confidence interval for the difference in proportions of people needing social services after attending preschool:

**P)** See above

**A)** See above

**I)** **Construct Interval**

**a)** **Using Formula**

$$CI = (\hat{p}_1 - \hat{p}_2) \pm z^* \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$$

$$CI = (.6129 - .8033) \pm 1.645\sqrt{\frac{(.6129)(.3871)}{62} + \frac{(.8033)(.1967)}{61}}$$

$$= (-.32, -.06)$$

**b)** **Using Calculator**

$\boxed{\text{STAT}} \rightarrow$ TESTS $\rightarrow$ 2PropZInt $\rightarrow (-.32, -.06)$

**S)** **State Conclusion** (Use *less* or *more*)

We are 90% confident that the percentage of poor children needing social services after attending preschool was between 6% and 32% less than those who did not attend preschool

Sec 10.2

# 2 Sample T Test

- Compares 2 means from 2 independent samples
- Use ANOVA to compare more than 2 means

Ex Is the average GPA of LN seniors greater than the average GPA of LC seniors?

# Conditions (Both Samples)

1) Random
2) Normal Sampling Distribution
    a) Population normal
    b) Large sample ($n > 30$)
    c) Justification for normality ($n < 30$) 
3) Independent
    a) Samples themselves
    b) $N_1 > 10(n_1)$ and $N_2 > 10(n_2)$

# Degrees of Freedom

Use smaller of $(n_1 - 1)$ or $(n_2 - 1)$

# Hypothesis Test

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \longrightarrow \text{Table B}$$

# Confidence Interval

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

↑ Table B

# Calculator Note

... Pooled: No Yes

**2-SAMPLE T TEST**

*This test is used to compare 2 means from 2 separate (independent) samples.*

To compare the strength of Bounty paper towels to generic paper towels, 30 of each were randomly selected. Each paper was uniformly soaked with 4 ounces of water and while holding opposite edges of the towel, the number of quarters each paper towel could hold before ripping was counted. Here are the results:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bounty** | 106 | 111 | 106 | 120 | 103 | 112 | 115 | 125 | 116 | 120 | 126 |
| | 125 | 116 | 117 | 114 | 118 | 126 | 120 | 115 | 116 | 121 | 113 |
| | 111 | 128 | 124 | 125 | 127 | 123 | 115 | 114 | | | |
| **Generic** | 77 | 103 | 89 | 79 | 88 | 86 | 100 | 90 | 81 | 84 | 84 |
| | 96 | 87 | 79 | 90 | 86 | 88 | 81 | 91 | 94 | 90 | 89 |
| | 85 | 83 | 89 | 84 | 90 | 100 | 94 | 87 | | | |

**Determine if Bounty paper towels are stronger than the generic brand at the $\alpha = .01$ level.**

**P) STATE POPULATION PARAMETERS:**

$\mu_1$ = avg # quarters a wet Bounty paper towel can hold

$\mu_2$ = avg # quarters a generic paper towel can hold

**H) STATE HYPOTHESES:**

$H_0: \mu_1 = \mu_2 \quad (H_0: \mu_1 - \mu_2 = 0)$

$H_a: \mu_1 > \mu_2 \quad (H_a: \mu_1 - \mu_2 > 0)$

**A) VERIFY CONDITIONS REQUIRED FOR TEST:**

a) Random

Random samples taken

b) Normal sampling distribution

Since $n_1$ and $n_2$ are both large, Central Limit Theorem applies

c) Independent

1) Samples independent

2) $N_B > 10(30) > 300$ sheets of Bounty ✓

$N_G > 10(30) > 300$ sheets of generic ✓

**T) PERFORM TEST USING:**

**a) T Distribution Table:**

*i)* Put data into lists and calculate x-bars/standard deviations (if necessary)

$\bar{X}_1 = 117.6$ $\bar{X}_2 = 88.13$

$Sx_1 = 6.64$ $Sx_2 = 6.30$

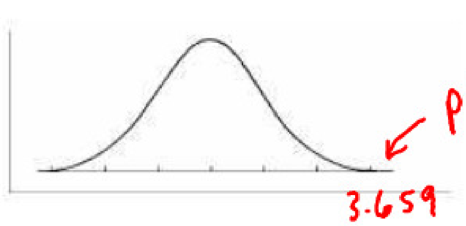
*ii)* Calculate t-statistic:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} = \frac{117.6 - 88.13}{\sqrt{\frac{(6.64)^2}{30} + \frac{(6.30)^2}{30}}} = 17.64$$

*iii)* Determine degrees of freedom:

$n_1 = n_2 = 30 - 1 = 29$

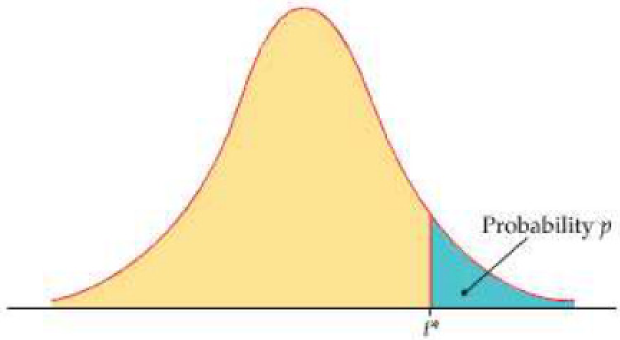
*iv)* Locate critical *t*-value and estimate *P*-value




$p < .0005$

$tcdf(17.64, 100, 29) = .00000000000000002$

Table entry for $p$ and $C$ is the critical value $t^*$ with probability $p$ lying to its right and probability $C$ lying between $-t^*$ and $t^*$.




## TABLE D

### *t* distribution critical values

| df | .25 | .20 | .15 | .10 | .05 | .025 | .02 | .01 | .005 | .0025 | .001 | .0005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Upper-tail probability $p$ | | | | | | |
| 1 | 1.000 | 1.376 | 1.963 | 3.078 | 6.314 | 12.71 | 15.89 | 31.82 | 63.66 | 127.3 | 318.3 | 636.6 |
| 2 | 0.816 | 1.061 | 1.386 | 1.886 | 2.920 | 4.303 | 4.849 | 6.965 | 9.925 | 14.09 | 22.33 | 31.60 |
| 3 | 0.765 | 0.978 | 1.250 | 1.638 | 2.353 | 3.182 | 3.482 | 4.541 | 5.841 | 7.453 | 10.21 | 12.92 |
| 4 | 0.741 | 0.941 | 1.190 | 1.533 | 2.132 | 2.776 | 2.999 | 3.747 | 4.604 | 5.598 | 7.173 | 8.610 |
| 5 | 0.727 | 0.920 | 1.156 | 1.476 | 2.015 | 2.571 | 2.757 | 3.365 | 4.032 | 4.773 | 5.893 | 6.869 |
| 6 | 0.718 | 0.906 | 1.134 | 1.440 | 1.943 | 2.447 | 2.612 | 3.143 | 3.707 | 4.317 | 5.208 | 5.959 |
| 7 | 0.711 | 0.896 | 1.119 | 1.415 | 1.895 | 2.365 | 2.517 | 2.998 | 3.499 | 4.029 | 4.785 | 5.408 |
| 8 | 0.706 | 0.889 | 1.108 | 1.397 | 1.860 | 2.306 | 2.449 | 2.896 | 3.355 | 3.833 | 4.501 | 5.041 |
| 9 | 0.703 | 0.883 | 1.100 | 1.383 | 1.833 | 2.262 | 2.398 | 2.821 | 3.250 | 3.690 | 4.297 | 4.781 |
| 10 | 0.700 | 0.879 | 1.093 | 1.372 | 1.812 | 2.228 | 2.359 | 2.764 | 3.169 | 3.581 | 4.144 | 4.587 |
| 11 | 0.697 | 0.876 | 1.088 | 1.363 | 1.796 | 2.201 | 2.328 | 2.718 | 3.106 | 3.497 | 4.025 | 4.437 |
| 12 | 0.695 | 0.873 | 1.083 | 1.356 | 1.782 | 2.179 | 2.303 | 2.681 | 3.055 | 3.428 | 3.930 | 4.318 |
| 13 | 0.694 | 0.870 | 1.079 | 1.350 | 1.771 | 2.160 | 2.282 | 2.650 | 3.012 | 3.372 | 3.852 | 4.221 |
| 14 | 0.692 | 0.868 | 1.076 | 1.345 | 1.761 | 2.145 | 2.264 | 2.624 | 2.977 | 3.326 | 3.787 | 4.140 |
| 15 | 0.691 | 0.866 | 1.074 | 1.341 | 1.753 | 2.131 | 2.249 | 2.602 | 2.947 | 3.286 | 3.733 | 4.073 |
| 16 | 0.690 | 0.865 | 1.071 | 1.337 | 1.746 | 2.120 | 2.235 | 2.583 | 2.921 | 3.252 | 3.686 | 4.015 |
| 17 | 0.689 | 0.863 | 1.069 | 1.333 | 1.740 | 2.110 | 2.224 | 2.567 | 2.898 | 3.222 | 3.646 | 3.965 |
| 18 | 0.688 | 0.862 | 1.067 | 1.330 | 1.734 | 2.101 | 2.214 | 2.552 | 2.878 | 3.197 | 3.611 | 3.922 |
| 19 | 0.688 | 0.861 | 1.066 | 1.328 | 1.729 | 2.093 | 2.205 | 2.539 | 2.861 | 3.174 | 3.579 | 3.883 |
| 20 | 0.687 | 0.860 | 1.064 | 1.325 | 1.725 | 2.086 | 2.197 | 2.528 | 2.845 | 3.153 | 3.552 | 3.850 |
| 21 | 0.686 | 0.859 | 1.063 | 1.323 | 1.721 | 2.080 | 2.189 | 2.518 | 2.831 | 3.135 | 3.527 | 3.819 |
| 22 | 0.686 | 0.858 | 1.061 | 1.321 | 1.717 | 2.074 | 2.183 | 2.508 | 2.819 | 3.119 | 3.505 | 3.792 |
| 23 | 0.685 | 0.858 | 1.060 | 1.319 | 1.714 | 2.069 | 2.177 | 2.500 | 2.807 | 3.104 | 3.485 | 3.768 |
| 24 | 0.685 | 0.857 | 1.059 | 1.318 | 1.711 | 2.064 | 2.172 | 2.492 | 2.797 | 3.091 | 3.467 | 3.745 |
| 25 | 0.684 | 0.856 | 1.058 | 1.316 | 1.708 | 2.060 | 2.167 | 2.485 | 2.787 | 3.078 | 3.450 | 3.725 |
| 26 | 0.684 | 0.856 | 1.058 | 1.315 | 1.706 | 2.056 | 2.162 | 2.479 | 2.779 | 3.067 | 3.435 | 3.707 |
| 27 | 0.684 | 0.855 | 1.057 | 1.314 | 1.703 | 2.052 | 2.158 | 2.473 | 2.771 | 3.057 | 3.421 | 3.690 |
| 28 | 0.683 | 0.855 | 1.056 | 1.313 | 1.701 | 2.048 | 2.154 | 2.467 | 2.763 | 3.047 | 3.408 | 3.674 |
| 29 | 0.683 | 0.854 | 1.055 | 1.311 | 1.699 | 2.045 | 2.150 | 2.462 | 2.756 | 3.038 | 3.396 | 3.659 |
| 30 | 0.683 | 0.854 | 1.055 | 1.310 | 1.697 | 2.042 | 2.147 | 2.457 | 2.750 | 3.030 | 3.385 | 3.646 |
| 40 | 0.681 | 0.851 | 1.050 | 1.303 | 1.684 | 2.021 | 2.123 | 2.423 | 2.704 | 2.971 | 3.307 | 3.551 |
| 50 | 0.679 | 0.849 | 1.047 | 1.299 | 1.676 | 2.009 | 2.109 | 2.403 | 2.678 | 2.937 | 3.261 | 3.496 |
| 60 | 0.679 | 0.848 | 1.045 | 1.296 | 1.671 | 2.000 | 2.099 | 2.390 | 2.660 | 2.915 | 3.232 | 3.460 |
| 80 | 0.678 | 0.846 | 1.043 | 1.292 | 1.664 | 1.990 | 2.088 | 2.374 | 2.639 | 2.887 | 3.195 | 3.416 |
| 100 | 0.677 | 0.845 | 1.042 | 1.290 | 1.660 | 1.984 | 2.081 | 2.364 | 2.626 | 2.871 | 3.174 | 3.390 |
| 1000 | 0.675 | 0.842 | 1.037 | 1.282 | 1.646 | 1.962 | 2.056 | 2.330 | 2.581 | 2.813 | 3.098 | 3.300 |
| $z^*$ | 0.674 | 0.841 | 1.036 | 1.282 | 1.645 | 1.960 | 2.054 | 2.326 | 2.576 | 2.807 | 3.091 | 3.291 |
| | 50% | 60% | 70% | 80% | 90% | 95% | 96% | 98% | 99% | 99.5% | 99.8% | 99.9% |
| | | | | | | Confidence level $C$ | | | | | | |

$t^*$

critical $t$

b) **CALCULATOR:**

$\boxed{\text{STAT}} \rightarrow$ TESTS $\rightarrow$ 2-SampTTest $\rightarrow t = 17.64$, $\rightarrow 2.9 \times 10^{-25}$

S) **STATE CONCLUSION IN CONTEXT:**

There is overwhelming evidence ($p < .0005$) to reject $H_0$ and conclude wet bounty paper towels hold more quarters than wet generic paper towels

**CONFIDENCE INTERVAL:**

Calculate a ~~99%~~ 98% confidence interval for the mean difference in the number of quarters that a wet Bounty paper towel can hold compared to a wet generic paper towel.

P) See above

A) See above

I) **Construct Interval:**

1.4697 + 1.323

4.11434

a) **Using Formula**

$$CI = (\bar{x}_B - \bar{x}_G) \pm t^* \sqrt{\frac{(s_B)^2}{n_B} + \frac{(s_G)^2}{n_G}}$$

$$CI = (117.6 - 88.1) \pm 2.462 \sqrt{\frac{(6.64)^2}{30} + \frac{(6.30)^2}{30}}$$

$$= 29.5 \pm 4.11$$

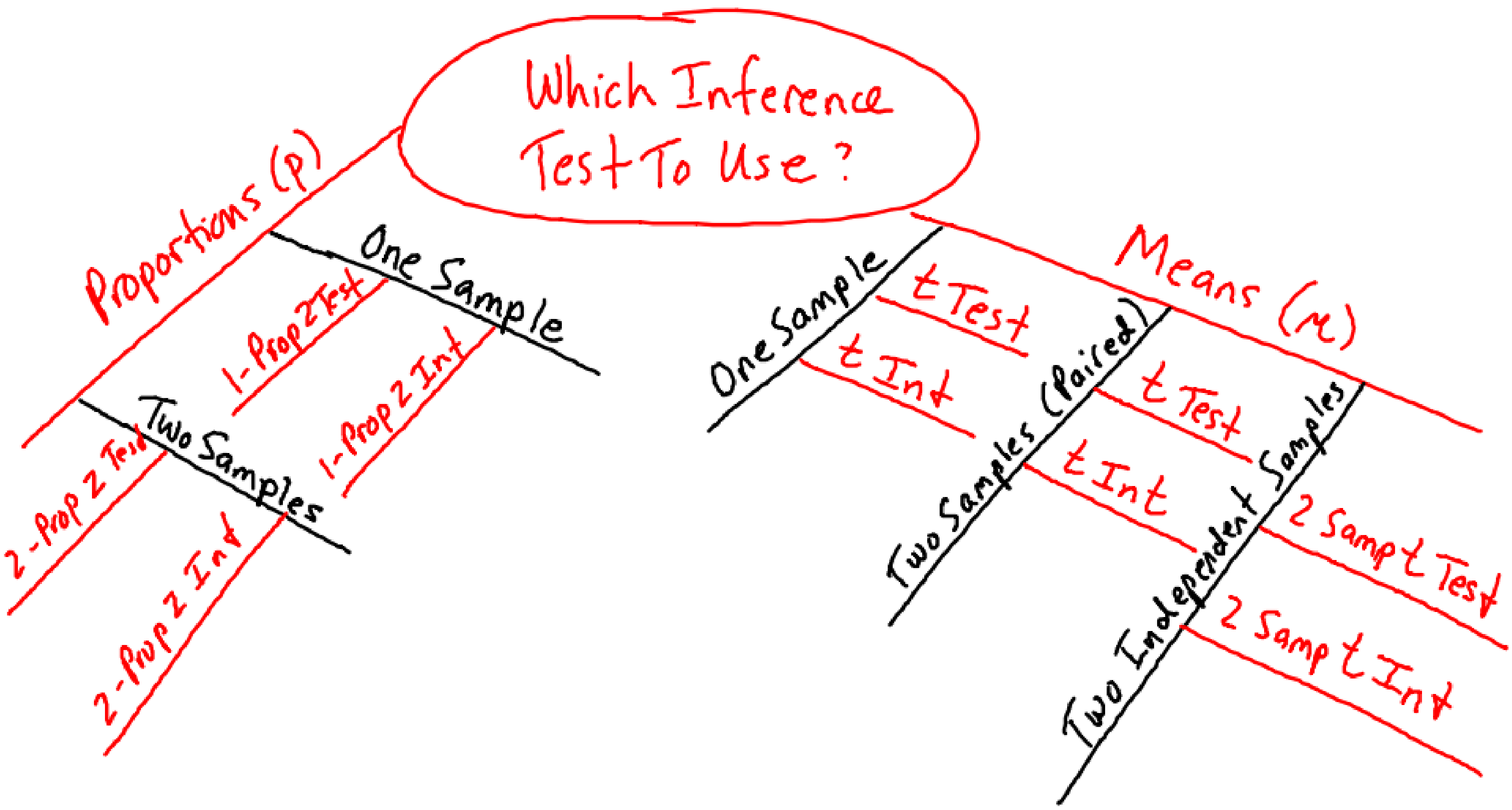
$$= (25.39, 33.61)$$ ☆

b) **Using Calculator**

$\boxed{\text{TESTS}} \rightarrow$ 2-SampTInt $\rightarrow (25.47, 33.46)$

S) **State Conclusion** (Use *less* or *more*)

☆ We are 98% confident that a wet bounty paper towel holds between 25 and 34 more quarters than a wet generic paper towel


Which Inference Test To Use?
Proportions (p)
One Sample
1-Prop Z Test
1-Prop Z Int
Two Samples
2-Prop Z Test
2-Prop Z Int
Means (μ)
One Sample
t Test
t Int
Two Samples (Paired)
t Test
t Int
Two Independent Samples
2 Samp t Test
2 Samp t Int