Instructions for: TI83, 83-Plus, 84-Plus for STP classes, Ela Jackiewicz

Computing areas under normal curves:

use 2nd VARS to get to the DISTR menu:

option 2 normalcdf(lower limit, upper limit, mean, standard deviation)
will give area between lower and upper limits
(mean=0 and St.dev=1 are default values)

Ex1 To find area between 1 and 1.7 under N(0,1) use
normalcdf(1,1.7,0,1)=.1141

Ex2 To find area under N(0,1) left of 2.3 use
normalcdf(-1000000, 2.3,0,1)=.9893
(use any large negative number as lower limit)

Ex3 To find area right of 2.11 under N(0,1) use
normalcdf(2.11,1000000,0,1)=.0174
(use any large positive number as upper limit)

Ex4 To find area under curve N(12,3) between 10 and 16 use
normalcdf(10, 16, 12,3)=.6563

Finding points from under the normal curves when area is given.

use 2nd VARS to get to the DISTR menu:

option 3 invNorm(area to the left, mean, standard deviation)
(mean=0 and St.dev=1 are default values)

Ex5 To find third decile of N(0,1) use invNorm(.3,0,1)=-.52

Ex6 To find 95th percentile of N(0,1) (or to find Z_{.05}) use
invNorm(.95,0,1)=1.645

Ex7 To find third quartile on N(12,3) use invNorm(.75,12,3)=14.02

Computing areas under t and chi-square curves:

use 2nd VARS to get to the DISTR menu:

tcdf (lower limit, upper limit, degrees of freedom)
χ² cdf(lower limit, upper limit, degrees of freedom)

Deal with infinity the same as with normalcdf
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Finding points from under the t- curves when area is given.

use 2nd VARS to get to the DISTR menu:

invT(area to the left, degrees of freedom)
Some older calculators do not have that option.

Computing Confidence Intervals for one population Mean:

Z interval procedure:
(σ is known, normal population or a large sample)

use STAT menu then TESTS
option7 is Zinterval

Ex 8 To find 90% CI for μ if $\bar{X} = 17$, n=10 and $\sigma = 4$ use

ZInterval
Inpt: Stats
$\sigma$: 4
$\bar{X}$: 17
n: 10
C-Level: .90

hit Enter interval is: (14.919, 19.081)

T interval procedure:
(σ is unknown, normal population or a large sample)

use STAT menu then TESTS
option8 is TInterval

Ex 9 To find 90% CI for μ if $\bar{X} = 17$, n=10, S=3.7 and use

TInterval
Inpt: Stats
$\bar{X}$: 17
S: 3.7
n: 10
C-Level: .90

hit Enter interval is: (14.855, 19.145)

Ex 10 To find 90% CI for μ when σ is unknown if you have data given: 45, 34, 71, 39

Use STAT menu then EDIT then input your data on any list (for ex L1)
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Then use STAT menu then TESTS

Option8 is Tinterval
Inpt:  Data
List:L1  (use 2nd 1 to input L1)
Freq:1
C-Level: .90

hit Enter interval is:(27.882,66.618)

Ex11 To find 90% CI for µ when σ is unknown if you have data given in a frequency table :

<table>
<thead>
<tr>
<th>x</th>
<th>frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>2</td>
</tr>
<tr>
<td>45</td>
<td>15</td>
</tr>
<tr>
<td>67</td>
<td>3</td>
</tr>
<tr>
<td>23</td>
<td>11</td>
</tr>
<tr>
<td>11</td>
<td>4</td>
</tr>
</tbody>
</table>

Use STAT menu then EDIT then input your data on any two lists (for ex  x on L1 and frequency on L2)
Then use STAT menu then TESTS

Option8 is Tinterval
Inpt:  Data
List:L1  (use 2nd 1 to input L1)
Freq:L2  (use 2nd 2 to input L2)
C-Level: .90

hit Enter interval is:(30.95,39.964)

Data option will work in a similar way for Zinterval procedure.

2 Sample T interval
use STAT menu then TESTS
option10 is 2-SampleTInterval

Use Stats option
then input sample means, st. deviations and sizes,
If Pooled Yes is selected, pooled test is performed, otherwise non pooled test is done.

1 Proportion Z interval
use STAT menu then TESTS
option A is 1-PropZInterval
It will use p-hat =x/n as estimate of p, just input x and n
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2 Proportions Z interval
use STAT menu then TESTS
option B is 2-PropZInterval
It will use p-hat method, just input x and n for each population

Conducting hypothesis tests for one population Mean:

Z test procedure:
(σ is known, normal population or a large sample)

use STAT menu then TESTS
option 1 is Z-test

Ex12 Test $H_0: \mu=15$ vs $H_a: \mu>15$, use $\alpha=.05$,
data gives $\bar{X}=17$ n=10 and $\sigma=4$, use

Z-test
Inpt: Stats
$\mu_0=15$
$\sigma:4$
$\bar{X}:17$
n:10
$\mu: >\mu_0$

hit Enter, you get $z=1.58$, $p=.056$ (p-value), do not reject $H_0$ since $p>.05$

T test procedure:
(σ is unknown, normal population or a large sample)

use STAT menu then TESTS
option 2 is T-test

Ex13 Test $H_0: \mu=15$ vs $H_a: \mu>15$, use $\alpha=.05$,
data gives $\bar{X}=17$ n=10 and $S=2.7$, use

T-test
Inpt: Stats
$\mu_0=15$
$S_x:2.7$
$\bar{X}:17$
n:10
$\mu: >\mu_0$

hit Enter, you get $t=2.34$, $p=.022$ (p-value), reject $H_0$ since $p<.05$
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Data option for Z-Interval and T-interval will work similar to the same option in the CI procedures (Ex 10 and 11)

Testing other Hypothesis

All tests are available in STATS TESTS option:

Tests for 2 populations means: 2-SampTTest (select POOLED YES or NO)

Test for paired samples: T-test, use $\mu_0 = 0$

In each test procedure Data option can be used if sample statistics are not computed. It works the same as confidence intervals procedures.

Test for 1 population proportion: 1-PropZTest

Test for 2 populations proportions: 2-PropZTest

Chi-square test of independence:
1. Use MATRIX menu to put observed frequencies in a matrix
2. Use $\chi^2$-Test, it is a nondirectional test, divide p-value by 2 for appropriate directional one

Chi-square GOF Test: only newer calculators;
1. Place observed and expected frequencies on 2 different lists, (STAT EDIT option)
2. Use $\chi^2$ GOF - Test

Computing probabilities for a Binomial Random Variable.

Let $X$ be binomial random variable, $p = .43$, $n = 25$ ($X$ = number of successes in 25 Bernoulli trials with probability of success $p = .43$)

use 2nd VARS to get to the DISTR menu:
option 10: binompdf(n, p, k) computes probability that $X=k$
option A: binomcdf(n, p, k) computes probability of $X \leq k$

Ex 14 a) Compute $P(X=5) = \text{binompdf}(25, .43, 5) = .01024$
   b) Compute $P(X \leq 5) = \text{binomcdf}(25, .43, 5) = .0144$
   c) Compute $P(X>5) = 1 - P(X \leq 5) = 1 - \text{binomcdf}(25, .43, 5) = .9856$