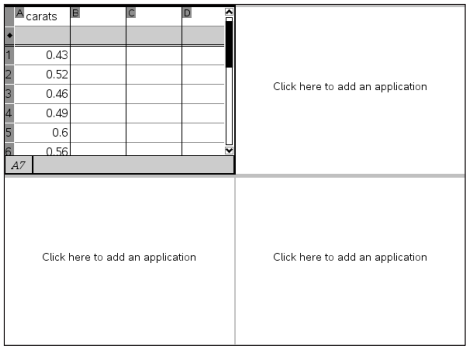
AP* Statistics Practice Questions Using TI-Nspire™ Technology

Example 3: A new process for producing synthetic gems yielded a random sample of six stones weighing 0.43, 0.52, 0.46, 0.49, 0.60, and 0.55, respectively.

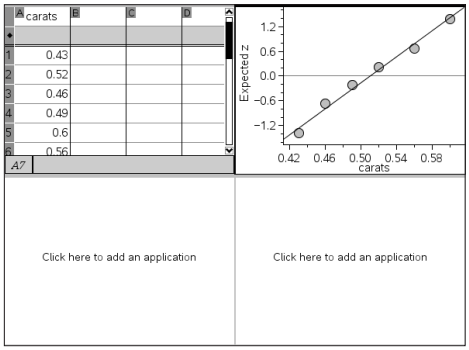
(a) Find a 95% confidence interval for the mean carat weight from this process.
(b) Test the claim that the mean weight is 0.55 carats against the counter claim that 0.55 is an overestimate.

Help from the TI-Nspire:

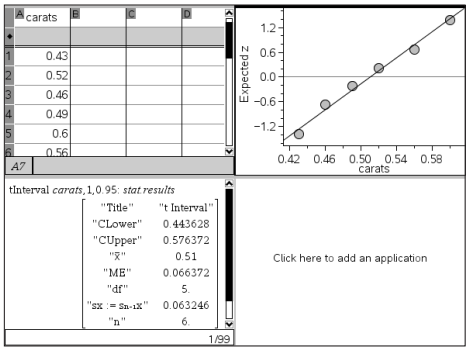
Select "ctrl ⌂" → "Page Layout" → "Select Layout" → "Layout 8"
Select "menu" → "Add Lists & Spreadsheet"
Name the column "carats" and enter the data.



Move to upper right quadrant. Select "Add Data & Statistics".
"Click to add variable" → choose "carats"
Select "menu" → "Plot Type" → "Normal Probability Plot"



Move to lower left quadrant. Select "Add Calculator".
Select "menu" → "Statistics" → "Confidence Intervals" → "t interval" →
Choose "Data" → "OK" → pick "carats" in List: → "OK"



From this TI-Nspire screen we can answer question (a):

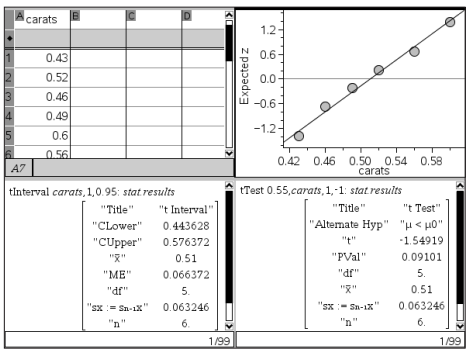
Name the procedure: This is a one-sample *t*-interval for the mean.

Check the conditions: We are given that this is a random sample, and the Nspire gives a normal probability plot which makes the nearly normal condition reasonable.

Mechanics: The Nspire gives $\bar{x} = 0.51$, s = 0.063246, df = 5, and a confidence interval of (0.444, 0.576).

Conclusion in context: We are 95 percent confident that the mean carat weight is between 0.444 and 0.576.

Move to lower right quadrant. Select "Add Calculator".
Select "(menu)" → "Statistics" → "Stat Tests" → "t test" →
Choose "Data" → "OK" → put .55 in μ0 → pick "carats" in List: →
Pick the Alternate Hyp to be "Ha: μ < μ0" → "OK"



From this Nspire screen we can answer question (b):

Identify the test and check the conditions: This is a one-sample *t*-test. We are given that we have a random sample, and the Nspire gives a normal probability plot which makes the nearly normal condition reasonable.

State the hypotheses: H_o: μ = 0.55, H_a: μ < 0.55

Mechanics: The Nspire gives t = -1.549 and a P-value of 0.091.

Conclusion in context with linkage to the P-value: With P = 0.091 < 0.10, there is evidence at the 10% significance level that the mean carat is below 0.55. However, with P = 0.091 > 0.05, there is no evidence at the 5% significance level to dispute the 0.55 carat claim.