HT's and CI's with *t*

CREDIT: The questions on this document were written by Erik Packard, PhD, Associate Professor of Mathematics at Colorado Mesa University.

- Problem 4

    o Biological measurements on the same species often follow a Normal distribution quite closely. The weights of seeds of a variety of winged bean are approximately Normal with a mean of 525 mg and a standard deviation of 110 mg. We wish to see if we have good evidence at the 5% significance level that the mean is over 525 mg for this variety.

    o <u>DATA</u>: SRS, a Sample Size of 22, a Sample Mean of 534.0, and a Sample Standard Deviation of 110 mg

    A) Before collecting data, what is the probability of not concluding the mean is over 525 mg when it actually is?

    B) Before collecting data, what is the probability of concluding the mean is over 525 mg when it actually is not?

    C) Give the critical value(s) (from the appropriate table).

    D) Give the value of the test statistic (from the data).

    E) Is the answer Yes or No?

    F) What is the *p*-value?

    G) Describe the meaning of the *p*-value in everyday terms.

    H) Give a 99% CI for the mean weights of all seeds of this variety.

- Problem 9

  o We wish to see if we have good evidence at the 10% significance level if there is any difference in the population of all healthy adult females in the mean absorption into the blood between a generic drug and the reference name brand drug. We will at random give half of the subjects the generic drug first and the rest of the subjects will take the reference drug first. In all cases, a washout period separated the two drugs so that the first had disappeared before the subject took the second. Assume the population standard deviation is 1000.

Subject:	A	B	C	D	E	F	G	H	I	J
Reference:	4110	2536	2769	3853	1832	2436	1999	1719	1829	2594
Generic:	1755	1148	1603	2254	1309	2120	1851	1878	1685	2643

Subject:	K	L	M	N	O	P	Q	R	S	T
Reference:	2354	1864	1022	2256	938	1339	1262	1438	1735	920
Generic:	2738	2202	1254	3051	1287	1930	1964	2549	3335	3044

A) Before collecting data, what is the probability of concluding a difference when there is no difference?

B) Before collecting data, what is the probability of not concluding a difference when there is a difference?

C) Give the critical value(s) (from the appropriate table).

D) Give the value of the test statistic (from the data).

E) Is the answer Yes or No?

F) What is the p-value?

G) Describe the meaning of the p-value in everyday terms.

H) Give a 95% CI for the mean difference (Reference – Generic) for all healthy adult females.