MATU9D2 : PRACTICAL STATISTICS

Spring 2017

PRACTICAL SESSION 6

- Hand Calculations 6
  One Sample t test
  Unpaired t test (and related CI)
  Paired t test (and related CI)

- Handout 1 of 2

ANSWER THE FOLLOWING QUESTIONS USING PEN, PAPER AND CALCULATOR - NOT COMPUTER

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N.B. In all the following examples assume that the data is Normally distributed.

1. Here are measurements (in mm) of a critical dimension for 16 car engine crankshafts:

224.22	224.01	224.02	223.98	223.99	223.96
223.96	224.09	223.99	223.98	223.90	223.95
225.00	224.06	223.91	224.00		

Summary Statistics

$\sum x = 3585.0200$ $\sum x^2 = 803274.0454$

The dimension is supposed to be 224mm in this population.

(i) Is there evidence that the mean dimension is not 224mm? Perform a test.
(ii) Calculate a 95% Confidence Interval for the mean to answer this question.

2. The following data show the abrasiveness of two brush on denture cleaners, A and B, measured by weight loss in milligrammes.

A	:	10.2	11.0	9.6	9.8	9.9
		10.5	11.2	9.5	10.1	11.8
B	:	9.6	8.5	9.0	9.8	
		10.7	9.0	9.5	9.9	

Summary Statistics

Denture Cleaner A	Denture Cleaner B
$\sum x_1 = 103.60$	$\sum x_2 = 76.00$
$\sum x_1^2 = 1078.44$	$\sum x_2^2 = 725.20$

(i) Perform an appropriate test to answer the question (assume the variances are equal): Does the data provide evidence that one of the denture cleaners is more abrasive than the other?
(ii) Calculate a 95% confidence interval for the true average difference and answer the question in (i).

3. A certain drug is to be tested for its effect on blood pressure. Twelve male patients have their diastolic blood pressure measured before and after receiving the drug with results shown below (in mmHg).

Patient	1	2	3	4	5	6	7	8	9	10	11	12
BP before	120	124	130	118	140	128	140	135	126	130	126	127
BP after	122	127	129	120	145	129	138	132	127	129	131	131

Do these results indicate that the drug may have an effect on diastolic blood pressure?
Perform an appropriate test to answer this question and also calculate a 95% confidence interval for the average effect in patients of this type.