MATH1001 Tutorial

Aims

1. Consolidate and expand your knowledge and understanding of course material.
2. Learn how to teamwork more efficiently.
3. Improve scientific presentation skills and critique skills.

Before the class

1. Review the lecture PPT of this week.
2. Bring a copy of attached worksheet to the tutorial class. It is better to print out a hard copy of worksheet. It will be easier for you to write solution in the worksheet.
3. Remember to sign in before the session starts. You will receive an individual mark for attendance.

In the class

1. The class will be split into 6 small groups (6-7 students in each group). The small groups will be randomly formed in the first tutorial, and will be fixed in the rest of tutorial sessions. The group should discuss the solution of attached worksheet.
2. Instructor will select one small group to present their worksheet solution. Each small groups will present twice. You will receive a group mark for this presentation.
3. Other students are encouraged to ask questions or make critical assessments on these solutions.

Agenda

1. Group discussion. 20min
2. Prestation. 30min

MATH1001 Worksheet III-3

6.3.3-4

As part of a study of the development of the thymus gland, researchers weighed the glands of five chick embryos after 14 days of incubation. The thymus weights (mg) were as follows:

29.6 21.5 28.0 34.6 44.9

For these data, the mean is 31.7 and the standard deviation is 8.7.

(a) Calculate the standard error of the mean.

(b) Construct a 90% confidence interval for the population mean.

(c) Construct a 95% confidence interval for the population mean.

(d) Interpret the confidence interval you found in part (a). That is, explain what the numbers in the interval mean. (See Examples 6.3.4 and 6.3.5.)

6.4.2

A medical researcher proposes to estimate the mean serum cholesterol level of a certain population of middle-aged men, based on a random sample of the population. He asks a statistician for advice. The ensuing discussion reveals that the researcher wants to estimate the population mean to within ±6 mg/dl or less, with 95% confidence. Thus, the standard error of the mean should be 3 mg/dl or less. Also, the researcher believes that the standard deviation of serum cholesterol in the population is probably about 40 mg/dl. How large a sample does the researcher need to take?

6.7.8

In a field study of mating behavior in the Mormon cricket (Anabrus simplex), a biologist noted that some females mated successfully while others were rejected by the males before coupling was complete. The question arose whether some aspect of body size might play a role in mating success. The accompanying table summarizes measurements of head width (mm) in the two groups of females.

	Successful	Unsuccessful
n	22	17
$\bar{y}$	8.498	8.440
s	0.283	0.262

(a) Construct a 95% confidence interval for the difference in population means. [Note: Formula (6.7.1) yields 35.7 degrees of freedom for these data.]

(b) Interpret the confidence interval from part (a) in the context of this setting.

(c) Using your interval computed in (a) to support your answer, is there strong evidence that the population mean head width is indeed larger for successful maters than unsuccessful maters?

7.2.10

In a study of the development of the thymus gland, researchers weighed the glands of 10 chick embryos. Five of the embryos had been incubated 14 days, and five had been incubated 15 days. The thymus weights were as shown in the table. 11 [Note: Formula (6.7.1) yields 7.7 df.]

(a) Use a t test to compare the means at $\alpha = 0.10$.

(b) Note that the chicks that were incubated longer had a smaller mean thymus weight. Is this "backward" result surprising, or could it easily be attributed to chance? Explain.

	Thymus weight (MG)	
	14 Days	15 Days
	29.6	32.7
	21.5	40.3
	28.0	23.7
	34.6	25.2
	44.9	24.2
n	5	5
$\bar{y}$	31.72	29.22
s	8.73	7.19

8.2.1

In an agronomic field experiment, blocks of land were subdivided into two plots of 346 square feet each. Each block provided two paired observations: one for each of the varieties of wheat. The plot yields (lb) of wheat are given in the table.

(a) Calculate the standard error of the mean difference between the varieties.

(b) Test for a difference between the varieties using a paired t test at a = 0.05. Use a nondirectional alternative.

(c) Test for a difference between the varieties the wrong way, using an independent-samples test. Compare with the result of part (b).

	Variety		
Block	1	2	Difference
1	32.1	34.5	−2.4
2	30.6	32.6	−2.0
3	33.7	34.6	−0.9
4	29.7	31.0	−1.3
Mean	31.53	33.18	−1.65
SD	1.76	1.72	0.68