

Homework 3  
MATH 4830, Spring 2006  
due Thurs. Feb. 9

1. A random sample of size 8 from the normal distribution  $N(\mu, 72)$  yielded  $\bar{x} = 85$ . Find the following confidence intervals for  $\mu$ , by hand. (Use the closest tabled value,)

- (a) 99%
- (b) 95%
- (c) 90%
- (d) Compare the width of the intervals in (a)-(c)

2. p. 52, Problem 19, (a)-(c) (omit (d)), by hand.

Note: the subscript 2 refers to the second group, Group B.

3. p. 52, Problem 20, (Repeat (a)-(c) (omit (d))), by hand.

Note: you can use a subscript 1 to refer to the first group, Group A.

4. The random variable  $Z$  is  $N(0, 1)$  (standard normal). Use the R function `pnorm` to find the following probabilities. The `pnorm` function returns the shaded or cumulative probability drawn in Table A.1 (p. 716-717).

- (a)  $P(Z < 1.96)$
- (b)  $P(Z > 1.96)$
- (c)  $P(Z < -1.62)$ .

Use the R function `qnorm` to find the value of  $z$  such that,

- (d)  $P(Z \leq z) = 0.95$
- (e)  $P(Z \leq z) = 0.975$ .

5. Return to the planets dataset from HW#2 ( p. 24 Problem 16 Data). Assume that the natural logarithms of the distance from the sun are observations from a normally distributed random variable  $X$  that is  $N(\mu, \sigma^2)$ .

- (a) In R, calculate a 95% confidence interval for  $\mu$ . Do **not** use the `t.test` function.
- (b) Is there evidence that the mean log distance is different from 5? Explain.