

**MATH 21-01 (Introductory Statistics), HW 8 (100 points). Due: 04/14/2017 in class.**

**From textbook (65 pts)**

For some problems below, please use R as requested. Reference for commands required to evaluate Binomial and Normal probabilities in R are widely available (see the recommended textbook or e.g. <http://www.r-tutor.com/elementary-statistics/probability-distributions/normal-distribution>).

- Section 6-5: 11, 16
- For the following problems, evaluate the given probability using R. Supply the commands you've used. Section 6-7: 5-8, 20.
- Section 7-2: 14, 15
- Section 7-3: 18, 20
- Section 7-4: 8, 13

**Not from textbook (35 pts)**

For the following, please use R to evaluate the confidence interval (i.e. evaluate the statistic and relevant fraction using R, then simply add and subtract from sample mean difference to construct the interval). Supply the commands which you have used. For the t-statistic, you can use e.g. `qt(.99, df = 10)`. Reference for this function can be found on e.g. <http://www.cyclismo.org/tutorial/R/probability.html>.

The following are two samples of measurements of saturated fat (g) in two separate yogurt brands (each company reports 4g per pack):

$A : [4.21, 4.13, 4.24, 4.32, 4.18, 4.10, 4.18, 4.28, 4.23, 4.27]$

and

$B : [4.27, 4.38, 4.25, 4.31, 4.40, 4.36, 4.33, 4.35, 4.17, 4.41]$

Using the statistic  $(t_{\frac{\alpha}{2}}, n_1 + n_2 - 2) \sqrt{s_p^2 \left( \frac{1}{n_1} + \frac{1}{n_2} \right)}$ , find the 90% and 99% confidence intervals for the difference between the two population means (of saturated fat content in the yogurts). What can you conclude from the confidence intervals regarding the two brands? Finally, assume that the yogurt fat contents are both normal (populations are both normal) and take  $\sigma_1 = s_1$  and  $\sigma_2 = s_2$ . Construct 90% and 99% confidence intervals with the z-statistic (i.e. using  $z_{\frac{\alpha}{2}}$ ). Please supply the R code used. How do these compare to the intervals you've obtained using the t-distribution?