Pharmacy 2012, Winter 2020, Stats Assignment 1, due Jan 21 at beginning of class

(Out of 50 points)

1. (Total 10 points) The length in cm. of 10 newborns are

$$41\ 40\ 38\ 38\ 38\ 32\ 33\ 38\ 30\ 34$$

(2)   (a) What is the mean length?

(2)   (b) What is the median length?

(2)   (c) What is the mode of the lengths?

(2)   (d) What is the variance of the lengths?

(2)   (e) What is the standard deviation of the lengths?

2. (Total 10 points) A sample of size 64 is chosen randomly from a population that can be described by a normal distribution with mean 12 and standard deviation 4.

(a) What is the sampling distribution for the sample mean? i.e., what is the shape, the mean
(6)   and the standard deviation?

(4)   (b) If we choose a larger sample, what is the effect on the mean and standard deviation?

3. (Total 20 points) If Z has a standard normal distribution:

(2)   (a) Find $P(Z \leq -1.645)$.

(2)   (b) Find $P(Z \leq 1.645)$.

(2)   (c) Find $P(Z > -1.645)$.

(2)   (d) Find $P(-1.645 < Z < 1.645)$.

(2)   (e) Find $P(|Z| \leq 1.645)$.

(2)   (f) Find $P(|Z| > 1.645)$.

(2)   (g) What is the value of c for which $P(Z > c) = .5000$?

(2)   (h) What is the value of c for which $P(Z \leq c) = .0202$?

(2)   (i) What is the value of c for which $P(Z > c) = .1$?

(2)   (j) What is the value of c for which $P(Z > c) = .2$?

4. (Total 10 points) A study was carried out where the objective of interest was the mean μ.

(a) If the 95% confidence interval for μ **contains** 7.3, then the 99% confidence interval for μ
(2)   will contain 7.3. (True, False, or insufficient information to decide.)

(b) If the 95% confidence interval for μ **contains** 7.3, then the 90% confidence interval for μ
(2)   will contain 7.3. (True, False, or insufficient information to decide.)

(c) If the 95% confidence interval for μ **contains** 7.3, then when testing the hypothesis
        $H_0 : \mu = 7.3$ against the alternative $H_a : \mu \neq 7.3$, the p-value will be greater than .05.
(2)   (True, False, or insufficient information to decide.)

(d) If the 95% confidence interval for μ **does not contain** 7.3, then when testing the
        hypothesis $H_0 : \mu = 7.3$ against the alternative $H_a : \mu \neq 7.3$, the p-value will be less
(2)   than .05. (True, False, or insufficient information to decide.)

(e) If the 95% confidence interval for μ **does not contain** 7.3, then when testing the
        hypothesis $H_0 : \mu = 7.3$ against the alternative $H_a : \mu \neq 7.3$, the p-value will be less
(2)   than .01. (True, False, or insufficient information to decide.)