Worksheet $6\frac{1}{4}$
Homework of 2012-04-02
Dr. M. P. M. M. McLoughlin
Spring of 2012

1. Suppose a random sample has been chosen of 20 wheat farmers in the Midwest and record the amount (X) that it costs per bushel to produce their crop. Prior experience (the 'real world') has 'shown' that, in the Midwest, the price per bushel of wheat is normally distributed with a mean and standard deviation that are real numbers and the standard deviation is not zero: so, assume the production cost per bushel of wheat has a mean of \$3.25 and a standard deviation of \$0.45 ($X \sim Nor(x, \mu_x = 3.25, \sigma_X = 0.45)$). Find the approximate probability that the average production cost per bushel in the sample will be between \$3.30 and \$3.45.

2. Suppose a random sample has been chosen of 40 wheat farmers in the Midwest and record the amount (X) that it costs per bushel to produce their crop. Prior experience (the 'real world') has 'shown' that, in the Midwest, the price per bushel of wheat is normally distributed with a mean and standard deviation that are real numbers and the standard deviation is not zero: so, assume the production cost per bushel of wheat has a mean of \$3.25 and a standard deviation of \$0.45 ($X \sim Nor(x, \mu_x = 3.25, \sigma_X = 0.45)$). Find the approximate probability that the average production cost per bushel in the sample will be between \$3.30 and \$3.45.

3. Suppose a random sample has been chosen of 40 wheat farmers in the South and record the amount (X) that it costs per bushel to produce their crop. Prior experience (the 'real world') has 'shown' that, in the South, the price per bushel of wheat is normally distributed with a mean and standard deviation that are real numbers and the standard deviation is not zero: so, assume the production cost per bushel of wheat has a mean of \$3.25 and a standard deviation of \$0.25 ($X \sim Nor(x, \mu_x = 3.25, \sigma_X = 0.25)$). Find the approximate probability that the average production cost per bushel in the sample will be between \$3.30 and \$3.45.

4. Consider Theorem 1.9 of Math 302 Handout II - version 3; Theorem 2.1 of Math 302 Handout II - version 3; Theorem 2.2 of Math 302 Handout II - version 3; Theorem 2.10 (part 2) of Math 302 Handout II - version 3; and, Theorem 2.17 (part 2) of Math 302 Handout II - version 3. These seem to be in conflict. It can not be the case that all these 'theorems' are true (or can it be?) and if not, where (or what) is the error?

That is all.