Math 3070 § 1.	Third Quiz	Name:
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This is an open book quiz. You are allowed to use your text, handouts and notes. Other books, laptops, PDA's and text messaging devices are prohibited. Calculators are permitted. Be sure to give complete explanations to receive full credit. There are [30] total points.



**Linear Combinations.** Lindon Industries manufactures two types of wire. Suppose the expected tensile strength of type-A wire is 103 ksi and the standard deviation of the tensile strength is 8 ksi. For type-B wire, the expected tensile strength is 100 ksi and the standard deviation of the tensile strength is 6 ksi. Let  $\bar{X}$  = the sample average tensile strength of a random sample of 49 type-A specimens, and  $\bar{Y}$  = the sample average tensile strength of a random sample of 36 type-B specimens.

1. [16] What is the mean  $\mu_{\bar{X}-\bar{Y}}$  and variance  $\sigma^2_{\bar{X}-\bar{Y}}$ ?

2. [4] What assumptions are you making to answer (1)? What is the approximate distribution of  $\bar{X} - \bar{Y}$ ? Justify your answer.

3. [10] Calculate (approximately)  $P(\bar{X} - \bar{Y} < 0)$ .