## Math/STAT 319 Homework 9 Due Apr. 5 (one page)

1. Ex 10.3 (revised) Let $\mu_1$ denote true average tread life for a premium brand of P205/65R15 radial tire and let $\mu_2$ denote true average tread life for an economy brand of the same size. Assume normality and use the following data: $m = 45, \bar{x} = 42500, \sigma_1 = 2200, n = 45, \bar{y} = 36800$ and $\sigma_2 = 1500$ for

   (a) Test $H_0 : \mu_1 - \mu_2 = 5000$ versus $H_0 : \mu_1 - \mu_2 > 5000$ at the level 0.01.

   (b) What is the 95% confidence lower bound for $\mu_1 - \mu_2$?

   (c) How would the conclusion change if $\sigma_1$ and $\sigma_1$ are unknown and replaced by $s_1$ and $s_2$?

2. Ex 10.31 (revised) The article "Characterization of Bearing Strength Factors in Pegged Timber Connections" (J. Struct. Engrg., 1997: 326C332) gave the following summary data on proportional stress limits for specimens constructed using two different types of wood:

| Type of wood | Sample size | Sample Mean | Sample SD |
|---|---|---|---|
| Red oak | 14 | 8.48 | 0.79 |
| Douglas fir | 10 | 6.65 | 1.28 |

   Assume that both samples were selected from normal distributions and use the pooled $t$ procedure:

   (a) carry out a test of hypotheses to decide whether the true average proportional stress limit for red oak joints exceeds that for Douglas fir joints by more than 1 MPa.

   (b) What is the 95% confidence lower bound for $\mu_1 - \mu_2$? $\mu_1$ denote true average proportional stress limit for red oak and $\mu_2$ denote true average proportional stress limit for Douglas fir.