# STAT2201, Semester 1 2016

**Quiz #3a (25 minutes)**

Name:_____

Student ID:_____

Lecture to which you are **enrolled** (circle one): Thursday / Friday

Let $M$ be your month of birth, i.e. $M \in \{1, 2, \ldots, 12\}$. $M =$ _____.

The quiz has two questions - one on each side of this paper. Please write your answers on this paper only. Do NOT hand in the formula sheet.

**Question 1:** You obtain a sample of $n = 15 + M$ height observations (the sample size in the question depends on your month of birth). Upon computing the sample mean ($\overline{x}$) and sample standard deviation ($s$) you find:

$$\overline{x} = 163.3, \qquad s = 10.2.$$

(a) Obtain a 90% confidence interval for the population mean height:

(b) What assumptions are required for this confidence interval to be valid?

**Question 2:** You are comparing the weights of two groups of items: 1 and 2. You wish to determine if their population means are the same or not. In the comparison you assume that weights are distributed Normally with a mean of $\mu_i$ for group $i$ and with the same variance for both groups, denoted by $\sigma^2$; but the means and variance are not known.

You obtain two random samples with $n_i$ observations for group $i$. Upon computing the sample means (denoted by $\overline{x}_i$) and sample standard deviations (denoted by $s_i$) you find:

$$\overline{x}_1 = 24.3, \qquad \overline{x}_2 = 27.4, \qquad s_1 = 3.2, \qquad s_2 = 2.7.$$

Assume that $n_1 = 5 + M$ and $n_2 = 10 + M$ (i.e. the number of observations in the question depends on your month of birth).

(a) Use the pooled sample variance to calculate your estimate for the population standard deviation $\sigma$:

estimate of $\sigma =$ _____

(b) Write out the hypotheses associated with this question:

$H_0$:

$H_A$:

(c) Calculate the test statistic and draw your conclusion with $\alpha = 0.05$: