

**Unit 7 – Hypothesis Testing**  
**Homework #11 (Unit 7 – Hypothesis Testing, part 1 of 2)**

**Due Monday November 23, 2015**  
**Last submission date for credit: Monday November 30, 2015**

1. **This exercise is asking for a hypothesis test of the equality of two means (continuous, normal distribution) in the setting of two independent groups. See, 7. Hypothesis Testing, pp 45-49.**

An independent testing agency was hired prior to the November 2012 election to study whether or not the work output is different for construction workers employed by the state and receiving prevailing wages versus construction workers in the private sector who are paid rates determined by the free market. A sample of 100 private sector workers reveals an average output of 74.3 parts per hour with a sample standard deviation of 16 parts per hour. A sample of 100 state workers reveals an average output of 69.7 parts per hour with a sample standard deviation of 18 parts per hour. In developing your answer, *you may assume that the unknown variances are equal*.

- (a) What is the achieved level of significance?  
**Hint – “Achieved level of significance” is the same thing as “p-value”**
- (b) Is there evidence of a difference in productivity at the 0.10 level of significance?  
**Hint – This question is asking you to compare the p-value you obtained in “a” to the threshold 0.10**
- (c) Is there evidence of a difference in productivity at the 0.05 level of significance?  
**Hint – This question is asking you to compare the p-value you obtained in “a” to the threshold 0.05**

2. For the data in Exercise 1, what level of significance (**Hint – solve for the p-value**) is achieved by the data if the sample means and sample standard deviations are unchanged but the within group sample sizes are

- (a) both equal to 10
- (b) both equal to 200
- (c) Comment on the role of sample size in the probability of a type I error.  
**Recall – The probability of a type I error is the probability of rejecting the null when the null is true.**