STA371G Homework Assignment 2

(25 Points. Due in class on Wednesday, 02/11/2015. Group homework.)
Please write down the NAME and EID of each group member. Each group consists of up to three members.

Problem 1 (5 points)

Suppose $Z \sim \mathcal{N}(0, 1)$, i.e., the random variable Z follows a standard normal distribution.

(a) Find $P(Z < -1.25)$.

(b) Find $P(Z > 1.50)$.

(c) Find $P(-0.10 < Z < 1.40)$.

Problem 2 (5 points)

Suppose $X \sim \mathcal{N}(5, 10)$, i.e., X is normal distributed with mean 5 and variance 10. Compute:

(a) $P(X > 5)$

(b) $P(X > 5 + 2 \times \sqrt{10})$

(c) $P(X = 8)$

(d) Express $P(-2 \leq X \leq 6)$ in terms of Z, the standard normal random variable.

Problem 3 (5 points)

Suppose that Z follows a standard normal distribution. The probability is 10% that Z is greater than what number?

Problem 4 (5 points)

A company can purchase raw material from either Supplier A or Supplier B and is concerned about the amounts of impurity the material contains. A review of the records for each supplier indicates that the percentage impurity levels in consignments of the raw material follow normal distributions with the means and standard deviations given in the table below. The company is particularly anxious that the impurity level in a consignment not exceed 5% and want to purchase from the supplier more likely to meet that specification. Which supplier should be chosen?

	Mean	Standard Deviation
Supplier A	4.4	0.4
Supplier B	4.2	0.6

Problem 5 (5 points)

The tread life of a particular brand of tires has a normal distribution with mean 40,000 miles and standard deviation 5,000 miles. What proportion of these tires will have tread lives between 35,000 and 45,000 miles? What proportion of these tires will have tread lives between 30,000 and 50,000 miles?