

**HOMEWORK 5**  
STA 321, Basic Statistical Theory I  
Spring Semester, 2014

**Due:** March 6th, 2011

This week, the homework focuses on normal distributions.

1. Find the probabilities of the following events for a standard normal random variable  $Z$ .  
(a)  $0 < Z < 1$  (b)  $0 < Z < 1.5$  (c)  $-1.5 < Z < 0.5$  (d)  $Z > 2.1$  (e)  $Z > -1.43$  (f)  $Z < 2.05$  (g)  $-2.22 < Z < -1.11$  (h)  $Z < -4.5$ .
  
2.  $X$  has a normal distribution with mean 200 and standard deviation 12. What is the probability that  $X$  is greater than 220? Less than 205? Between 180 and 190?
  
3.  $X$  has a normal distribution with mean 17 and standard deviation 10. What is the 10th percentile of this distribution? The 85th percentile? The interquartile range?
  
4. Find the  $z$ -value such that the interval from  $\mu - z\sigma$  to  $\mu + z\sigma$  contains the following probability for a normal distribution.  
(a) 50% (b) 80% (c) 90% (d) 95% (e) 99% (f) 99.9% (g) 99.99%