**HW #7**

readings in text: pages 152-162, 223-227

1. If Z is a standard normal random variable ( Z ~ N(0,1) ), find (and draw the appropriate diagrams for):

a) P(0 < Z ≤ 2.17) b) P( 0 <Z <1) c) P( -2.5 ≤ Z < 0) d) P( -1.5 ≤ Z < 2) e) P(1.37 ≤ Z ≤ 2.5)

2. If Z is a standard normal random variable ( Z ~ N(0,1) ), find the value of c such that: (and draw the appropriate diagrams for )

a) P( Z < c) = .9838 b) P(0 ≤ Z ≤ c) = .291 c) P(c ≤ Z) = .121 d) P( -c ≤ Z ≤ c) = .668

3. Suppose tree diameters are normally distributed with mean 8.8 inches and standard deviation 2.8 inches. Answer the following questions, and draw the appropriate diagrams:

a) What is the probability that a randomly selected tree will be at least 10 inches in diameter?

b) What is the probability that a randomly selected tree will be larger than 20 inches in diameter?

c) What is the probability that a randomly selected tree will have a diameter between 5 and 10 inches?

d) What is the value of c such that the interval (8.8-c, 8.8+c) includes 98% of all diameter values?

e) If four trees are independently selected, what is the probability that at least one has a diameter exceeding 10 inches?

4. If X is a normally distributed random variable with mean .30 and standard deviation .06 : (draw appropriate diagrams)

a) Find P(X > .25)

b) P(X < .10)

c) How would you describe the largest 5% of all values of X? (or: What is the 95th percentile of all values of X?)

5. Suppose that 10% of all steel shafts produced by a certain process are non-conforming and must be scrapped. Consider a random sample of 200 shafts. What is the approximate probability that:

a) at most 30 of the 200 will need to be scrapped?

b) between 15 and 25 (inclusive) will need to be scrapped?

6. The breaking strength of a rivet has a mean value of 10,000 psi and a standard deviation of 500 psi. What is the probability that the sample mean breaking strength of a random sample of 40 rivets is between 9900 and 10,200 psi?

7. The time taken by a randomly selected applicant for a mortgage to fill out a certain form has a normal probability distribution with average time 10 minutes and a standard deviation of 2 minutes. If five individuals fill out the form on Day 1 and six individuals fill out the form on Day 2, what is the probability that the sample average time taken is less than 11 minutes for BOTH days?