New York City College of Technology

MAT1272 EXAM III (takehome) Halleck Spring 2012

20 points for each question. Show all work. For all problems, to receive any credit, you **must** draw a diagram for the distribution with enough detail that it will serve as a check for your answer.

1. The scores of an exam were normally distributed with a mean of 67 and a standard deviation of 18. The following chart shows percentile cutoffs for student scores (e.g., a student who scores better than at least 10% of his or her fellow students but less than 30% will receive a D):



* 1. What is the probability that a random score is between 45 and 75?
  2. If Sally’s score was at the 35th percentile, what was it?
  3. What was Sally’s letter grade?
  4. To get a C, Jack must have what score at a minimum?
  5. Jill thought she got an A but instead got a B+. Jill must have scored below what value?

1. The height of a male black bear is normally distributed with a mean of 30 inches and standard deviation of 3 inches.
   1. If a sample of 9 male bears is selected at random, what is the probability that their average height is above 31 inches?
   2. If a sample of 36 male bears is selected at random, what is the probability that their average height is above 31 inches?
   3. How many male bears must be selected so that there is only a 5% chance that the average will be above 31 inches?
2. The number of major tornados in Kansas each year is approximately normally distributed with a mean of 230 and a standard deviation of 110
   1. Find the probability that in a given year there will be fewer than 50 tornadoes.
   2. Find the probability that in a given year there will be between 100 and 300 tornadoes.
   3. The governor will establish an emergency fund to be released only in 5% of years. What number of tornadoes should he set to trigger the release of funds?
3. Light-Bulbs-R-us (LIBRUS) says that the average life of their Bright light bulb is at least 1000 hours with standard deviation 240 hours. The Consumer Truth Organization (CTO) selects 36 bulbs and finds their average lifespan is 950 hours. Can CTO question LIBRUS’s claim? (Use a 5% level of significance.) [Make sure to state the null and alternative hypothesis clearly.This is a **known** standard deviation problem, use a z-test.]
   1. Use the **pvalue** approach
   2. Use the **critical value** approach
4. During a campaign to fight a legislative effort to control drug prices, the National Drug Association (NDA) claimed that the average annual per person spending on prescription drugs is less than $400 for those 50 years or older. The Association of Elders (AE) performs a survey of 64 randomly selected people 50 years or older and finds an average spending of $448 with a measured standard deviation of $192. Can AE reject the claim of NDA that the average is less than $400? (Use a 5% level of significance and the **critical value** approach.) [Make sure to state the null and alternative hypothesis clearly. This is an **unknown** standard deviation problem, use a t-test.]