

# Math 166 - Spring 2008

## Exam 3 Review

### Week-in-Review #9

*courtesy: Kendra Kilmer*

(covering Sections 8.1-8.6 and 5.1-5.3)

- How much would you have to deposit in an account earning 4.5%/year simple interest if you wanted to have \$1000 after 6 years?
- How much would you have in 8 years if you invest \$1,500 into an account earning 5.4%/year compounded quarterly?
- How long will it take an investment to double if it is earning 3.5% annual interest compounded monthly?
- What is the future value of \$35,000 invested at 6.5% annual interest compounded continuously for 5 years?
- Which would give you a better return: 3.89%/year compounded daily or 3.91%/year compounded quarterly?
- If quarterly deposits of \$30 are put into an account earning 3.5% per year compounded quarterly, how much will be in the account at the end of 30 years?
- Nick currently has \$500 in his travel funds account that earns interest at 2.45% per year compounded monthly. He plans on depositing \$75 each month to save for a trip to Europe. If he needs \$5,000 for the trip to Europe, when will he be able to go?
- Meghan deposits \$10 every week into an account in which the interest is compounded weekly. In 3 years she discovers that her investment has grown to \$2,000. What is the effective rate of interest earned on this account?
- At the beginning of 1996, Lisa and Kevin bought a home for \$125,000. They put 5% down and then financed the remaining price of the home with a 30 year mortgage at an 8.54% annual interest rate compounded monthly on the unpaid balance.
  - What were their monthly payments?
  - At the beginning of 2006 they decided to refinance the home with a 20 year mortgage at a 6.5% annual interest rate compounded monthly on the unpaid balance. What are their new monthly payments?
  - How much money are they saving in interest by refinancing?
- Chris has been living it up and has accrued \$6,000 of credit card debt on a card that charges 18.4% per year compounded monthly on the unpaid balance. But lucky for Chris the minimum payment due each month is only \$95.
  - Assuming he doesn't make any more purchases, how long will it take Chris to pay off his debt?
  - If Chris decides to pay \$50 extra a month, how long will it take Chris to pay off his debt?
  - How much money is he saving by paying a little extra each month?
- Classify each random variable as finite discrete, infinite discrete, or continuous AND describe/list the possible values of the random variable.
  - An experiment consists of randomly selecting a 20 ounce bottle of coke. Let  $X$  represent the actual amount of liquid in it.
  - An experiment consists of randomly selecting jelly beans out of a jar (with replacement) until a green jelly bean is drawn. Let  $Y$  represent the number of jelly beans drawn.
  - An experiment consists of randomly selecting 10 students at Texas A&M. Let  $Z$  represent the number of freshmen selected.
- An experiment consists of randomly selecting two numbers (without replacement) from a jar that contains 5 slips of paper numbered 1-5. Let  $X$  represent the sum of the two numbers drawn.

- Find the probability distribution of  $X$ .
- Draw the histogram for the random variable  $X$ .
- Compute  $E(X)$

- Lisa and Kevin decide to play a game. Lisa randomly selects a sample of 2 cards out of a standard deck of 52. If the two cards drawn are of the same suit, Kevin pays Lisa \$2. If the two cards drawn are of the same rank, Lisa pays Kevin \$4. Otherwise, Lisa pays Kevin \$A. Find the value of  $A$  that makes this game fair.
- An experiment consists of rolling a pair of fair six-sided dice. Find the odds against the event that the sum of the numbers landing uppermost is 7.

- Students in a class of 100 were randomly assigned to groups of five. The number of freshmen in each group was observed. The table below gives the results.

Number of Freshmen	0	1	2	3	4	5
Number of Groups	2	4	5	6	2	1

Find the mean, standard deviation, median, and mode of the number of freshmen in a randomly selected group.

- A random variable  $X$  has a mean of 50 and a standard deviation of 3. Use Chebychev's Inequality to determine the value of  $A$  for which  $P(50 - A \leq X \leq 50 + A) \geq 0.9375$ .
- Studies have shown that 3% of all live births in Texas are multiple births (twins, triplets, etc.). At a given hospital in which there are 50 live births,
  - What is the probability that exactly 2 of the births are multiple births?
  - What is the probability that at most 5 of the births are multiple births?
  - What is the probability that between 6 and 10 of the births, inclusive, are multiple births?
  - How many births would you expect to be multiple births in this group?
  - What is the standard deviation of the number of multiple births in this group?
- Let  $X$  be a normal variable with  $\mu = 0$  and  $\sigma = 45$ . In each of the following, find  $a$ .
  - $P(X \geq a) = 0.2567$
  - $P(-2a \leq X \leq 2a) = 0.8754$
- The GPAs of randomly selected freshmen at a certain university was normally distributed with a mean of 2.55 and a standard deviation of 0.30. If a freshmen is randomly selected, what is the probability that their GPA is greater than 3.00?
- It is known that 76% of all students at a certain university have financial aid. If 5,000 students are randomly selected, what is the probability that at least 3,800 but fewer than 4,500 have financial aid. Use the appropriate normal distribution to approximate the binomial probability.