Business statistics

Chapters 1-3: In order to control costs, a company wishes to study the amount of money its sales force spends entertaining clients. The following is a random sample of six entertainment expenses (dinner costs for four people) from expense reports submitted by members of the sales force. $157, $132, $109, $145, $125, $139. Calculate the mean and sample variance(s^2) and standard deviation. Mean = 807/6 = 134. 5. Sample Variance = (109925 — (807^2/6)/6-1 = (109925 — 108541)/5 = 1384/5 = 276. 8. Standard Deviation = âˆš276. 8 = 16. 6373. ***the 109925 is all values of x individually squared and then summed together. ***the 6-1 is because it is a sample, if this were a population it would just be 6. ***the 807 is the sum off all x. Coefficient of Variation = (16. 63/134. 5)*100 = 12. 3643. Calculate estimates of tolerance intervals containing 68. 26, 95. 44, and 99. 73 percents. Mean ± 1 SD (68. 26%) = 134. 5 ± 16. 63 = [117. 87, 151. 13]. Mean ± 2 SD (95. 44%) = 134. 5 ± 33. 26 = [101. 24, 167. 76]. Mean ± 3 SD (99. 73%) = 134. 5 ± 49. 89 = [84. 61, 184. 39]. Compute and interpret some of the Z-scores. (157-134. 5)/16. 63 = 1. 35 standard deviations above the mean. (109-134. 5)/16. 63 = -1. 53 standard deviations below the mean. Mean is the average of all the data. Mode is the number that occurs most frequently in the data set. Median is the middle value or average of the two middle values when the data is arranged in order from smallest to larges. Chapter 4: Basic Probability Concepts: In an organization of 30 people, we wish to elect 3 officers. How many different groups of officers are possible? 30*29*28= 24, 360 (if only 1 person per office). Or 30*30*30= 27, 000 (if 1 person can hold more than one office). Combinations: number of different combinations of N items taken n at a time: N!/n!(N-n)!. How many ways can we elect an executive committee of three from an organization of 30

members? 30!/3!(30-3)! = 24360/6 = 4060. We have four different flags and four slots on a flag pole. How many different arrangements of flags are possible? 4*3*2*1 = 24. If we have four flags available for a flagpole with four slots, but the American flag must be on top, how many different arrangements of the four flags are possible? 1*3*2*1 = 6. How many different license plates can be created if a license plate must consist of 2 letters followed by a four digit number? 26*26*10*10*10*10 = 6, 760, 000. If 15 people are available for jury duty, how many different juries of 12 can we obtain? 15!/12!*3! = 455. What is the probability of drawing a king, a jack, and a queen in sequence from a full deck? P(KJQ) = 4/52*4/51*4/50 = . 000483. What is the probability of obtaining 3 heads in a row if you toss a coin three times? P(HHH) = ½*1/2*1/2= 1/8. If you roll a die two times, what is the probability of rolling a 1 first and a 2 second? P(1&2) = 1/6*1/6= 1/36. If you roll a die, what is the probability of rolling a 1 or a 2? P(1 U 2) = 1/6+1/6-0/6 = 2/6. If you draw a card from a full deck, what is the probability of drawing a king or a heart? P(K U â™¥)= 4/52+13/52-1/52 = 16/52. | Performance: | | | Attendance | Pass | Fail | | Regular | 97 | 4 | 101 | Irregular | 71 | 28 | 99 | | 168 | 32 | 200 | | Performance: | | | Attendance | Pass | Fail | | Regular | 97/200= . 485 | . 02 | . 505 | Irregular | . 355 | . 14 | . 495 | | 168/200 = . 84 | 32/200=. 16 | 1. 0 | Find the probability that a randomly selected student had regular attendance. (Marginal Prob) P(Reg)= 101/200. Find the probability that a randomly selected student had regular attendance and passed the course (Joint Prob). P(Reg&Pass)= 97/200. Find the probability tht a randomly selected student failed the course given regular attendance (Conditional Prob). P(Fail/Reg) = 4/101. Find the probability that a randomly selected student failed the course or had irregular attendance (or

Both is implied) (Union Prob). P(Fail U Irr.) = 32/200 + 99/200 — 28/200 = 103/200. Suppose a CPA firm has been retained to conduct an audit of the accounting practices of a firm in which accounts are processed by two divisions, a wholesale division and a retail division. It is known that 60% of all accounts are retail accounts. Furthermore, it is known that 20% of all retail accounts and 10% of all wholesale accounts contain some type of accounting error. | Retail | Non Retail | | Error | . 2*. 6=. 12 | . 1*. 4=. 04 | . 16 | No Error | . 48 | . 36 | . 84 | | . 6 | . 4 | | If an auditor observes an accounting error in an account, find the probability that the account was processed by the firm's retail division. P(Ret./Err) = . 12/. 16 = . 75. What is thee probability that an account selected at random will have no accounting errors? P(No Err) = . 84. Chapter 5: Discreet Probability Distribution Sample Problem -- calculating the mean, variance, and standard deviation of a random variable. X p(x) Mean xp(x) Variance= (x-mu)^2 variance*p(x) Standard Dev. = x^2p(x) 0 . 01 0 10. 1761 . 10176 0 1 . 09 . 09 4. 7961 . 431649 . 09 (1^2*. 09) 2 . 30 . 6 1. 4161 . 42483 1. 2 (2^2*. 3) 3 . 20 . 6 . 0361 . 00722 1. 8 (3^2*. 2) 4 . 20 . 8 . 6561 . 13122 3. 2 (4^2*. 2) 5 . 10 . 5 3. 276 . 32761 2. 5 (5^2*. 1) 6 . 10 . 6 7. 8961 . 78961 3. 6 (6^2*. 1) Mu 3. 19 Var 2. 2139 Stand. Dev. 12. 39 Binomial: Five percent of American truck drivers are women. Suppose 10 truck drivers are selected randomly to be interviewed about quality of work conditions. Let x= no. of women selected. What is the probability that two of the drivers will be women? P(x= 2, n= 10, p=. 05) Can look up in binomial tables or : (10!/2! 8!)*. 05^2*. 95^8=. 07463. what is the probability that none will be women? Look up in table, or (10!/0! 10!)*. 05^0*. 95^10=. 598737. What is the probability that at least one will be a woman? P(xâ‰¥1, n= 10, p=. 05) = 1-. 59874 = . 40126. What is the expected number of

women? 10(. 05) = . 5. An insurance company will insure $50, 000 diamond for its full value against theft at a premium of $400 per year. Suppose that the probability that the diamond will be stolen is . 005, and let x denote the insurance company’s profit. Probabilities: Not Stolen: x= 400, p(x)=. 995. Stolen: x= 49, 600, p(x)=. 005. Calculate the insurance company’s expected profit. 400(. 995) — 49600(. 005) = 398 — 248 = $150. Find the premium that the insurance company should charge if it wants its expected profit to be $1, 000. 1000= x(. 995) — (50000 — x)*. 005 = . 995x- 250 + . 005x = 1250. Poisson Distribution for Intervals: p(x)= (e^-mu*mu^x)/x!. During the period of time phone in reservations are being taken at a local university, calls come in at the rate of one every two minutes. What is the expected number of calls in one hour? Mu= 1, Interval= 2 mins. 1/2mins = 30/60mins, SO 30 expected calls in one hour. What is the probability of three calls in five minutes? P(3)= ½ mins = mu/5mins = 2. 5/5mins, SO (e^-2. 5 * 2. 5^3)/3! = . 2138. What is the probability of no calls in five minutes? P(0) = (e^-2. 5 * 2. 5^0)/0! = . 0821. Chapter 6: Continuous Probability Distributions: Normal Curve. **f(x)= 1/(d-c) for câ‰¤xâ‰¤d. Mean = (c+d)/2, standard deviation = (d-c)/âˆš12. Delta airlines quotes a flight time of 2 hours, 5 minutes for its flights. Suppose that we believe that actual flight times are uniformly distributed between 2 hours and 2 hours, 20 minutes. Give a formula for the function of flight times. f(x)= 1/(140-120)= 1/20. What is the probability that the flight will be no more than five minutes late? X= 130 so 50%. What is the probability that the flight will be more than ten minutes late? X= 135 so 25%. What is the expected flight time? (120+140)/2= 260/2= 130 mins. **Hint** draw graphs!! The driving distance for the top 60 women golfers is between 238. 9 and 261. 2 yards. Assume that the driving distance for these

women is uniformly distributed over this interval. Give a mathematical expression for the probability curve of driving distance. f(x)= 1/(261. 2-238. 9) = 1/22. 3. What is the probability the driving distance for one of these women is less than 250 yards? P(x 245