210 Final A
KEY

1. What is the 5-number summary of Salary? (6 points)

$Min = 31,000$ $Median = 50,800$ $Max = 81,400$

$Q1 = 44,675$ $Q3 = 59,675$

2. What is the mean and standard deviation of Age? (6 points)

$42.6 = \bar{x}$

$10.63 = S$

3. Answer the following questions based on your pivot table. Suppose a survey respondent is randomly selected from the pool.

a. What is the probability the person is a female? (6 points)

$12/30 = 2/5$

b. What is the probability that the person is has opinion 2? (6 points)

$4/30 = 2/15$

c. What is the probability that the person is both female and has opinion 2? (6 points)

$2/30 = 1/15$

d. What is the probability that the person is female given that they have opinion 2? (6 points)

$2/4 = 1/2$

e. What is the probability the person has opinion 2 given that they are female? (6 points)

$$\frac{2}{12} = \frac{1}{6}$$

f. What is the probability that the person either is female or has opinion 2? (6 points)

$$\frac{12 + 4 - 2}{30} = \frac{14}{30} = \frac{7}{15}$$

g. Are the variables Gender and Opinion independent? Why or why not? Show math to support your conclusion. (10 points)

they are not since $\frac{12}{30} \neq \frac{2}{4}$

4. Use the bar graph to describe something about how the opinions of men and women differ in this survey. (6 points)

a greater percentage of the women have opinion 1. Many more men have opinion 3.

5. Using your histogram of age, describe the shape of the distribution. (5 points)

answers will depend on # of bins
mine is very slightly skewed right

6. Looking at the box plot (and descriptive stats) of salary, is there any evidence of a skew? Would you describe that evidence as strong or weak? (6 points)

very slight. the top bar is larger Than bottom one box is a bit uneven and mean pulled a bit above median, but not dramatically so.

7. From your pie graph of opinions, which opinion ranking appears to be the most common? What percent of the survey takers reported that opinion? (6 points)

1 is most common.

27%

8. Looking at the scatterplot of Alcohol Usage vs. Blood pressure, report the linear regression equation and R^2 value. (8 points)

$$y = 0.4221x + 29.073$$

$$R^2 = 0.2556$$

9. Which relationship appears to be stronger? The relationship between alcohol use and blood pressure, or smoking and blood pressure? (6 points)

Smoking & BP are stronger

10. What is the R^2 value of the stronger relationship? Interpret what this value means in the context of the data. (8 points)

0.4083

about 41% of the variability in BP can be explained by its relationship to smoking

11. What is the mean and standard deviation of the probability distribution provided? (8 points)

$$\mu = 1.5 \qquad \sigma = 1.162$$

12. Were you able to find a p value that creates a binomial distribution identical to this data? Report the p value here. (6 points)

$$P = .10$$

$$(\text{agrees w/ } np = 15(.10) = 1.5)$$

Calculations in Excel: (1) 40 points, (2) 28 points, (3) 15 points.

Part II:

13. Suppose that the annual return on XYZ stock follows a normal distribution with mean 15% and standard deviation 8.3%.

a. What is the probability that XYZ's value will decrease during the following year? (i.e. percent return will be less than 0%) (8 points)

$$3.54\%$$

b. What is the probability that XYZ's return will be greater than 25%? (8 points)

$$11.41\%$$

c. For what percent return value does XYZ stock have only a 5% chance of exceeding that value? (8 points)

$$28.65\%$$

d.   What is the probability of XYZ's rate of return will fall between 10% and 18%? (8 points)

36.77%

14. Suppose that Comdell Computer receives its hard drives from Diskco. On average, 4% of all hard disk drives received by Comdell are defective.
   a.   Comdell has adopted the following policy: It samples 50 hard drives in each shipment and accepts the shipment if all hard drives in the shipment are not defective. What fraction of shipments will Comdell accept? (8 points)

13%

   b.   Suppose instead that the shipment is accepted if at most one hard drive in the sample is defective. What fraction of shipment will Comdell accept? (8 points)

40%

   c.   What is the probability that a sample size of 50 will contain at least 10 defectives? (8 points)

2.47×10^{-5} or   .0000247

Upload your completed Excel files to the Final Exam (to be graded) submission box in Blackboard, and submit your completed paper exam to your instructor. You may not modify anything once the exam is submitted.

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$P(A|B) = \frac{P(A \text{ and } B)}{P(B)}$$

$$\mu = E(X) = \sum x_i p(x_i)$$

$$\sigma^2 = Var(X) = \sum (x_i - \mu)^2 p(x_i)$$

$$\mu_{binomial} = np$$

$$\sigma^2_{binomial} = np(1 - p)$$