Stat 1030 Exam 2 Prep Worksheet Monday Week 10

DIRECTIONS:

- In today's class we'll work three problems: A, B, and C.
- The work is open-notes. Work together with Prof. Whitten, classmates and TAs.
- **Carry calculations to at least 4 decimal places (but exact answers using calculator memory button is easier and faster!)**

(G O O D L U C K ! !)

$$p(x) = \left[{}_nC_x \right] p^x (1-p)^{n-x} \qquad \mu = np \qquad \sigma^2 = np(1-p) \qquad Z = \frac{x-\mu}{\sigma} \qquad Z = \frac{\bar{x}-\mu}{\sigma_{\bar{x}}} \qquad Z = \frac{\widehat{p}-p}{\sigma_{\widehat{p}}}$$

$$\sigma^2_{a+bx} = b^2\sigma^2_x \qquad \sigma^2_{x+y} = \sigma^2_x + \sigma^2_y \qquad \sigma^2_{x-y} = \sigma^2_x + \sigma^2_y$$

Problem A

DIRECTIONS:

Prof. Whitten will lead discussion of Problem A as an ICE-BREAKER after Spring Break.

- Take complete notes!
- Allow your mind to re-acclimate to Stats, the Z Table, etc.
- Have your **calculator ready!** Calculate answers when directed by Prof. Whitten.

Yang Zhu is an international student with a financial goal for the spring semester: He needs to earn \$1200 to purchase round-trip airfare for a visit home this summer before returning to Iowa City to resume his studies at UI next fall.

Each Friday afternoon Yang hands out 100 coupons on campus for discount meals at a restaurant located in downtown Iowa City. The restaurant pays Yang \$2.50 for every customer who redeems (uses) a coupon at the restaurant. (The coupons have Yang's name written in small print so that he receives credit for the sale.) History shows that 35% of persons who accept a coupon while walking around campus actually redeem the coupon. Assume 15 weeks in the semester.

What are Yang's chances for success? Does he need to think about getting a second job to achieve his goal?

1. Provide an English definition for a variable x whose units of measurement are *coupons*. (Write below.)

2. The variable x is what type of random variable? **Answer:** _____

3. Provide an English definition for a variable y whose units of measurement are *dollars*. (Write below.)

4. Write an equation which expresses the mathematical relationship between x and y.

   Answer: _____

5. Find the mean or expected value of x. **Answer:** _____

6. Find the standard deviation of x. **Answer:** _____

7. Find the mean or expected value of y. **Answer:** _____

8. Find the standard deviation of y. **Answer:** _____

9. Apply the Bell Curve Rule to the variable y: There's about a 95% chance that the money which Yang earns this semester is between which two values?

   - low value **Answer:** _____
   - high value **Answer:** _____

10. (Choose the single best answer.) The chances that Yang achieves his goal by distributing coupons are

    (a) between 0% and 2.5%
    (b) more than 2.5% but less than 16%
    (c) more than 16% but less than 50%
    (d) more than 50% but less than 84%
    (e) more than 84% but less than 97.5%
    (f) between 97.5% and 100%

Problem A Revisited: Second Solution

DIRECTIONS:

Now we'll solve Problem A in a completely-different way!

- Open to **Topic 6 Example 7 (page 243) in the Notebook.** There you'll see a similar example and formulas.

- On the previous page we determined that Yang's probability of success is between 97.5% and 100%. Now we'll calculate the actual probability that Yang will achieve his goal!

(end of Problem A)

Problem B

DIRECTIONS:

- Work this problem ON YOUR OWN. Use the Notebook and your neighbors! Check answers with TAs!

Professor Blowhard claims that he makes 80% of all of his basketball free throws. He shoots 5 free throws every day in April. (April has 30 days.)

1. Define a random variable x which applies to the entire month of April.

2. Attach numerical values to any *letters* associated with the variable x.

3. Find the probability that the professor makes four free throws on April 1.

4. Find the probability that he makes at least 15 free throws during the first five days in April.

(continued)

5. Find the probability that he makes at least 115 free throws during April.

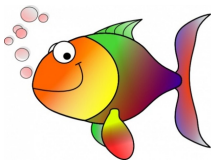
(end of Problem B)

Problem C

DIRECTIONS:

- Work this problem ON YOUR OWN. Use the Notebook and your neighbors! Check answers with TAs!

A very large number of fish swim in the Iowa River. Their weights are normally distributed with mean 1.30 kilograms (kg) and standard deviation 0.40 kg. Legally, fish caught which weigh less than 0.50 kg must be thrown back into the river.



1. Define a random variable x (in English.)

2. Attach numerical values to any *parameters* which describe the statistical population.

3. What percentage of fish caught in the Iowa River must legally be thrown back?

4. A poacher catches 63 fish one night on the Iowa River and doesn't throw any of them back. What's the probability that he catches more than 80 kg worth of fish?