

Name \_\_\_\_\_

**(A) Constructing and Interpreting Histograms**

(A.1) Download the basketball data for today. Peruse the data to make sure it looks okay. Adjust the data for any obvious errors.

(A.2) Construct a histogram and cumulative histogram of the successful free-throw attempts. For bins, use 0, 1-2, 3-4, ... 9-10. Label the chart well and give it an understandable title.

Use the histogram to answer each of the following questions.

(A.3) What percent of students made 1-2 successful shots? \_\_\_\_\_

(A.4) What percent of students made 3-4 successful shots? \_\_\_\_\_

(A.5) What percent of students made zero successful shots? \_\_\_\_\_

(A.6) What percent of students made 9-10 successful shots? \_\_\_\_\_

(A.7) What percent of students made 4 or less successful shots? \_\_\_\_\_

(A.8) What percent of students made 8 or less successful shots? \_\_\_\_\_

(A.9) What percent of students made 3 or more successful shots? \_\_\_\_\_

(A.10) What percent of students made 7 or more successful shots? \_\_\_\_\_

(A.11) If we sum the height of all the histogram bars that sum would be

- a) Less than one
- b) Equal to one
- c) Greater than one
- d) Impossible to tell

(A.12) If we sum the height of each point on the cumulative histogram line that sum would be

- a) Less than one
- b) Equal to one
- c) Greater than one
- d) Impossible to tell

**(B) Histograms in Business**

**Students are playing a game whereby their profits / losses depend on the following equation.**

$$\text{Profits} = \{(\# \text{ successful shots}) - 2\} * 100$$

(B.1) Suppose one student from this sample was asked to shoot the ball, where their profits are determined by the above equation. What is the probability they would make money?

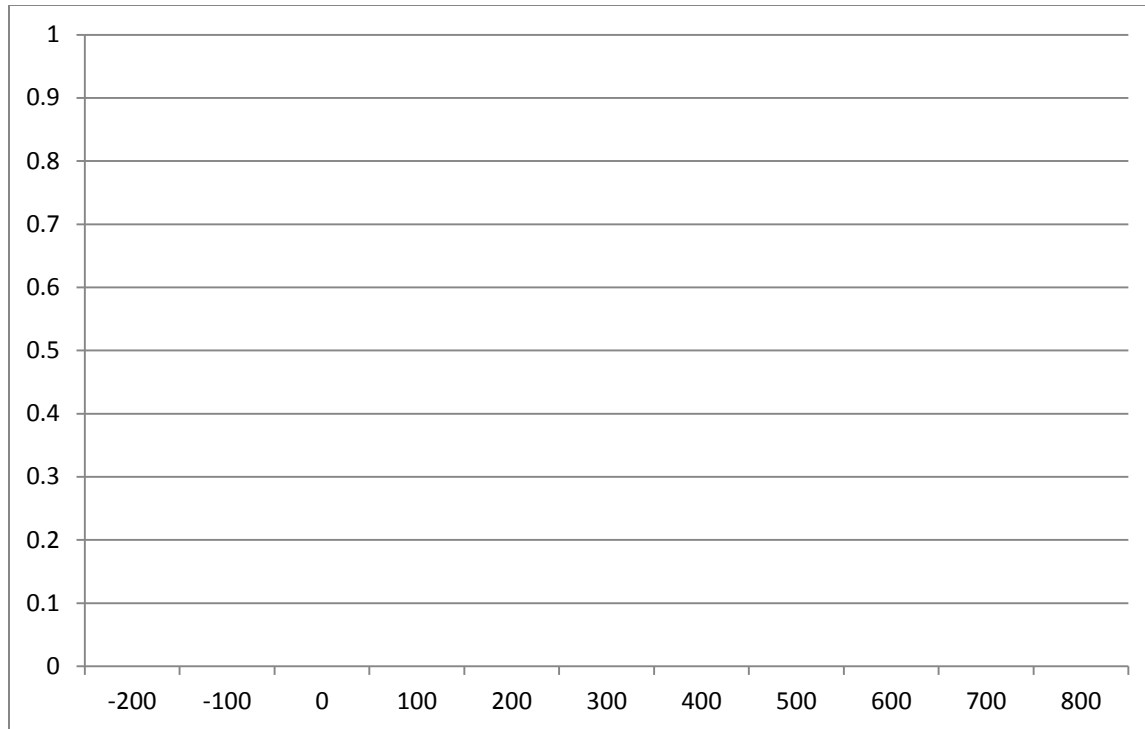
(B.2) What is the probability they would lose money or break even?

(B.3) Suppose that you were an insurance company that sold policies paying the student an indemnity of \$100 if they made zero successful shots. On average, what indemnity would you be paying to each student? That is, if this game were played over and over and you sold insurance to each student, would be your indemnity payments on a per student basis?

(B.4) What would be the minimum price you would need to charge each student to make money on this policy?

### (C) Histogram of Profits and Losses Using Historical Simulation

(C.1) Go to the original data and calculate the profits / losses each student would have made based on the equation from part B. Using the *countif(.)* function to determine the ~~number~~ **percent** of students earning profits -\$200, -\$100, \$0, \$100, ..., \$800. Use these values to hand-draw a histogram of simulated profits in the chart below.



(C.2) Calculate the VaR for a student using a threshold of ~~43%~~ **10%**.