

Name: _____ **Time of Section:** _____

All of your work on this exam must be entirely your own. You may use a calculator and an 8.5×11 sheet of notes. Show your work, making sure to define events and random variables that you consider.

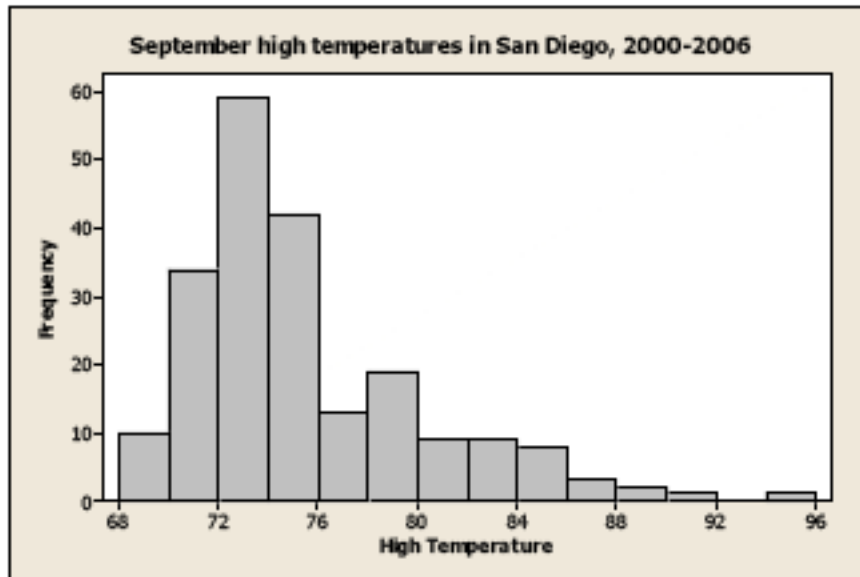
1. [9 pts.] Suppose a box contains 7 red marbles and 5 blue marbles. If you pick two marbles from the box (without replacement), what is the probability that both are red?

2. An archer shoots 10 times at a target, each time hitting the target with probability .83. Assume the outcomes of the 10 shots are independent.

a) [8 pts.] What is the probability that the archer hits the target exactly 8 times?

b) [8 pts.] What is the probability that the first hit comes on the second shot?

3. Below is a histogram of the September high temperatures in San Diego for the last seven years (2000-2006).



a) [4 pts.] Do you think the mean is greater than the median, the median is greater than the mean, or the median and mean are the same?

b) [4 pts.] Based on the histogram, is the standard deviation of the September high temperatures closest to 1, 5, 20, or 60?

c) [4 pts.] If the temperature on one day were incorrectly recorded as 999, would this error have a greater effect on the mean or median?

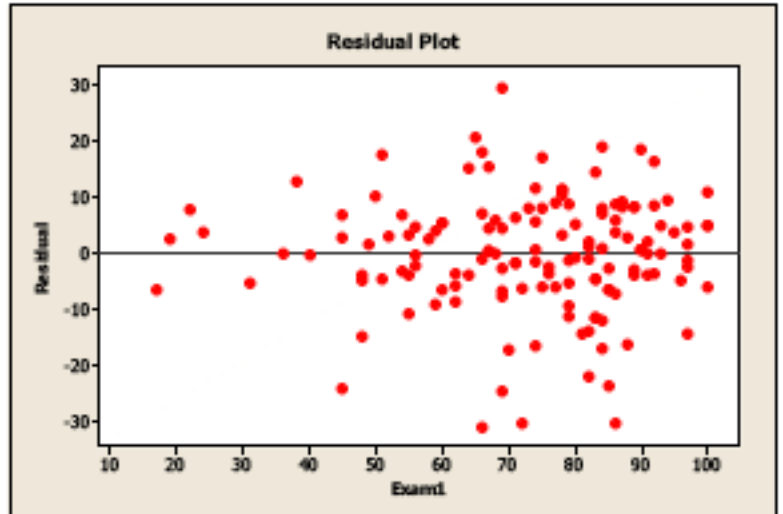
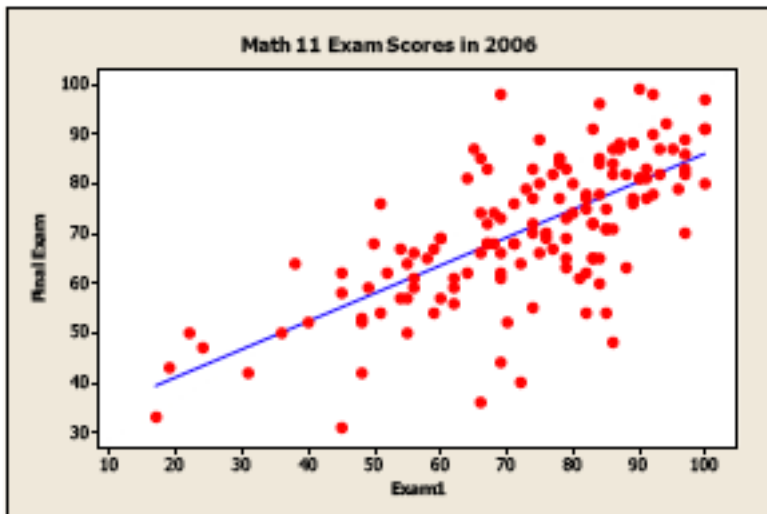
d) [4 pts.] If the temperature on one day were incorrectly recorded as 999, would this error have a greater effect on the standard deviation or interquartile range?

4. We have grades of last year's Math 11 students on the first midterm exam and the final exam. We are interested in predicting the final exam score from the first midterm score using linear regression. Below is some computer regression output, as well as a scatterplot and residual plot.

Regression Analysis: Final Exam versus First Midterm

The regression equation is Final Exam = $29.7 + 0.562$ First Midterm

$S = 10.3792$ $R\text{-Sq} = 48.2\%$.



a) [5 pts.] Do you think that linear regression is a reasonable way to predict the final exam score from the first midterm score? Explain clearly what you are looking for in the plots.

b) [8 pts.] If a student scored 90 on the first midterm, what does the regression predict for the student's final exam score?

c) [4 pts.] Write a sentence explaining the meaning of the slope of the regression line.

d) [4 pts.] Write a sentence explaining the meaning of the R-squared value of 48.2%.

e) [4 pts.] What is the correlation between the first midterm score and final exam score?

5. [12 pts.] Suppose 17 percent of people who exercise regularly develop high blood pressure, and 24 percent of people who don't exercise regularly develop high blood pressure. Suppose 30 percent of people exercise regularly. If you know that a person has high blood pressure, what is the probability that the person exercises regularly?

6. Suppose you play a game in which you get 0 points with probability $\frac{2}{3}$ and 3 points with probability $\frac{1}{3}$.

a) [12 pts.] Find the expected value and standard deviation of the number of points you get when you play the game.

b) [10 pts.] Find the expected value and standard deviation of the number of points you get if you play the game 4 times. Assume the four outcomes are independent.