

Math 1070  
Exam 1

Name : \_\_\_\_\_

**No outside materials allowed except pens or pencils and a calculator. You have all class period to finish the test. Remember to label all graphs, plots, and charts. SHOW ALL WORK.**

Some things you might want to keep in mind :

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

$$z_{x,i} = \frac{x_i - \bar{x}}{s_x}$$

$$a = \bar{y} - b\bar{x}$$

$$\hat{y} = a + bx$$

$$s_x = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}}$$

$$r = \sum_{i=1}^n z_{x,i} z_{y,i}$$

$$b = r \left( \frac{s_y}{s_x} \right)$$

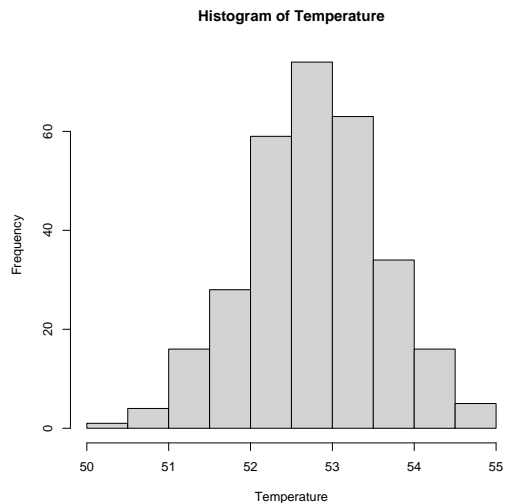
$$e = y - \hat{y}$$

1. I am going to buy a full suspension bike this summer and have done a little research. The table below shows a few brands along with price and weight. I am mainly interested in how price is affected by weight.

Brand and Model	Price	Weight
Trek VRX200	1000	32
GT XCR-4000	940	34
Specialized FSR	1100	30
Cannondale Super V400	1100	31

- (a) **(10 points)** What is the explanatory variable? What is the response variable?
- (b) **(10 points)** Sketch a scatterplot.
- (c) **(15 points)** If  $r = -0.951$ ,  $s_x = 1.707$  and  $s_y = 78.95$ , calculate the regression coefficients  $a$  and  $b$ .
- (d) **(15 points)** Santa Cruz makes a bike they claim weighs 23 pounds. How much should I expect to pay?

2. The graph below shows a histogram of U.S. average temperatures for the last 200 years. Answer the following questions.



- (a) **(30 points)** Describe the distribution using the Empirical Rule if  $\bar{x} = 52.79$  and  $s_x = 0.83$ .
- (b) **(10 points)** Do you think that the Empirical Rule is valid for this data? Why or why not?
- (c) **(10 points)** Is annual temperature increasing or decreasing, or can we not tell using this graph? If we cannot tell, what kind of graph would we need?

3. Jim's boss may send him to a conference next month. His boss will pick three of the five members of his team at random to go to the conference. The other four team members names are Dwight, Ryan, Karen and Stanley. Answer the following.
- (a) **(20 points)** What is the sample space for this problem?
  - (b) **(15 points)** What is the probability that Jim will have to go with Ryan and Karen?
  - (c) **(15 points)** Jim and Dwight don't get along, what is the probability they will have to go together?

4. The following table shows results from the 2002 General Social Survey for married adults classified by gender and level of happiness.

<b>Gender</b>	<b>Level of Happiness</b>			<b>Total</b>
	Very Happy	Pretty Happy	Not too Happy	
Male	221	95	9	<b>325</b>
Female	149	120	9	<b>278</b>
<b>Total</b>	<b>370</b>	<b>215</b>	<b>18</b>	<b>603</b>

- (a) **(15 points)** Estimate the probability that a married adult is very happy.
- (b) **(20 points)** Estimate the probability that a married adult is very happy
- i. given that their gender is male,
  - ii. given that their gender is female.
- (c) **(15 points)** For these subjects, are the events being very happy and being male independent?

5. Use the data to answer the following questions

2 4 11 12 13 15 31 31 37 47 50

- (a) **(20 points)** Find the median, first quartile (Q1) and the third quartile (Q3).
- (b) **(20 points)** Draw a boxplot for this data.
- (c) **(10 points)** Are there any outliers? How do you know?