

MATH 126
 Quiz #5: Statistics

Name: Key

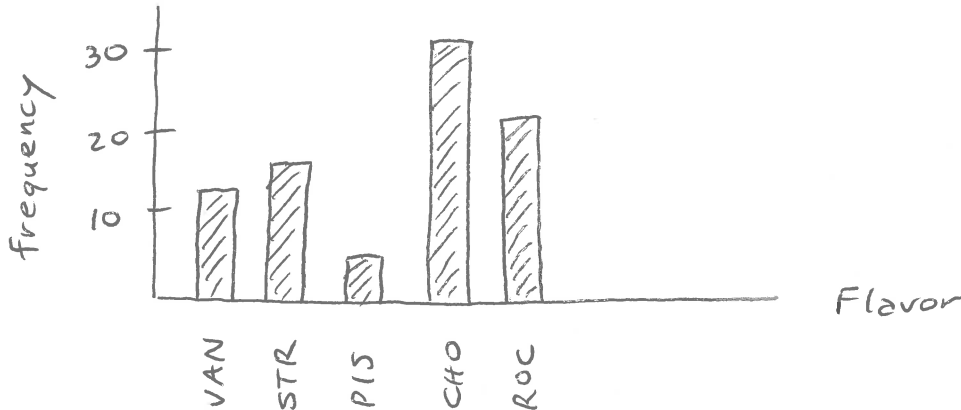
Directions: Read each question carefully and provide your answers in the space provided. Be sure to show all relevant work. You may use a calculator (no cell phones) but correct answers without the supporting work will not receive full credit.

1. Walking around downtown River Falls, you decide to conduct an unscientific poll by asking residents their favorite ice cream flavor. Here is your data:

Ice cream flavor	Frequency
Vanilla	12
Strawberry	15
Pistachio	6
Chocolate	31
Rocky Road	22

total = 86

- (a) (5 points) Construct a bar graph using the data above. Label the axes and use a proper scale.

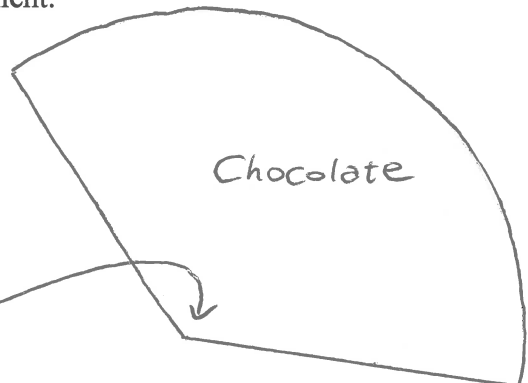


- (b) (6 points) Draw the sector (piece of pie) that corresponds to a pie graph that represents "Chocolate." No need to construct the full pie chart—just the Chocolate piece. Show any calculations you make and be precise in your measurement.

Chocolate

$$\frac{31}{86} = .3604\dots$$

$$.3604 (360^\circ) \approx \boxed{129.77^\circ}$$



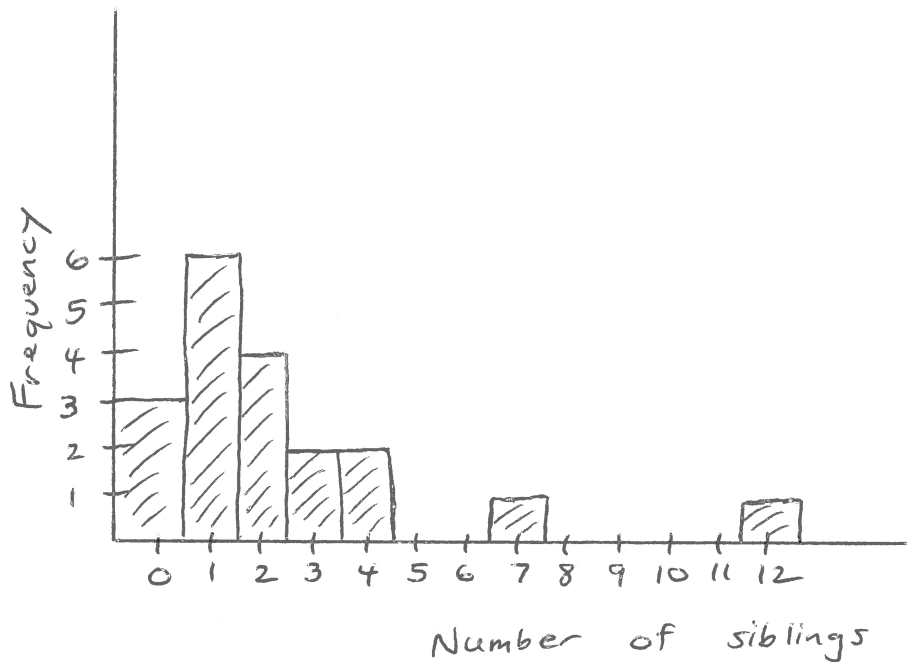
2. Suppose we collect data by asking people how many siblings they have. Here are the results:

0 1 4 0 2 2 3 1 7 3 1 4 1 2 1 0 12 1 2

(a) (4 points) Organize the data (i.e., make a frequency table).

number of siblings	Frequency (how many)
0	3
1	6
2	4
3	2
4	2
7	1
12	1

(b) (6 points) Make a histogram using this data. Label all axes.



3. (5 points) James and Maria are comparing their scores on ten algebra quizzes and determine that they both have the same mean score. They also discover that the standard deviation for James's scores is 17.1, while the standard deviation for Maria's scores is 4.6. Which statement about the two sets of quiz scores **must** be true?

- The median of Maria's scores is lower than the median of James's scores.
- James's scores are, on average, 12.5 points higher than Maria's scores.
- James's scores are more spread out than Maria's scores.
- James's highest score is greater than Maria's highest score.

(C)

4. Here are Neesha's scores in chemistry this semester: 82, 84, 74, 95, 20, 82. Calculate the following or answer the questions below.

(a) (3 points) Mean: 72.83

$$\bar{x} = \frac{437}{6} \approx 72.83$$

(b) (3 points) Median: 82

20, 74, 82, 82, 84, 95
 ↑ ↑

(c) (6 points) The mean and median (from parts (a) and (b) above) are both designed to measure *something*. What do they measure? In this case, which one does a better job? Defend your answer.

The center or "middle" of the data set.
 In this case, the median is better. The mean 72.83 seems a bit low and this is due to the one low score (20) influencing the mean.

(d) (3 points) Range: 75

$$95 - 20 = 75$$

(e) (10 points) Standard Deviation Calculation. Fill in the chart below (only where it is shaded) and be sure to identify your final answer. The first column has been filled in for you.

x	\bar{x}	$x - \bar{x}$	$(x - \bar{x})^2$	
82	72.83	9.17	84.089	
84	↓	11.17	124.769	
74		1.17	1.369	
95		22.17	491.509	
20		-52.83	2791.009	
82		9.17	84.089	
			3576.834	← $\sum(x - \bar{x})^2$
			5	← $n - 1$
			26.75	SD = $\sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}}$

Standard deviation →

(f) (3 points) What is the meaning of the quantity calculated in part (e)? This is a measure of spread (dispersion). Small SD \Rightarrow data are close together.

(g) (3 points) For this data, how many scores are within one standard deviation of the mean? together.

$$72.83 - 26.75 = 46.08$$

$$72.83 + 26.75 = 99.58$$

Five out of six scores are within 1 SD of the mean.

Larger SD \Rightarrow data are spread apart.

