

Name: * ANSWER KEY *
 Math 173-FG

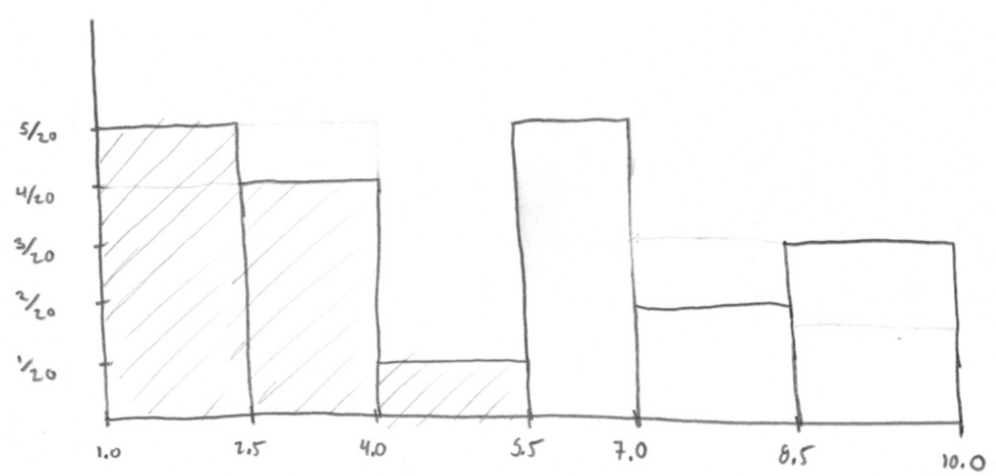
9/11/2019
 Quiz 1

1. Here are 20 measurements.

1.52164, 3.78586, 6.00574, 6.66092, 7.44297, 1.63493, 6.54875, 1.37472, 3.94679, 6.41819,
 5.40011, 9.24275, 3.18373, 2.08434, 9.13555, 6.73865, 3.26314, 7.61009, 1.42427, 9.18479

(a) (24 points) Create a relative frequency histogram below using 6 classes of width 1.5. The first class should be [1.0, 2.5).

CLASS	Tally	FREQUENCY	REL. FREQ.
[1.0, 2.5)		5	$\frac{5}{20}$
[2.5, 4.0)		4	$\frac{4}{20}$
[4.0, 5.5)		1	$\frac{1}{20}$
[5.5, 7.0)		5	$\frac{5}{20}$
[7.0, 8.5)		2	$\frac{2}{20}$
[8.5, 10.0)		3	$\frac{3}{20}$



(b) (6 points) What proportion of the measurements are less than 5.5?

$$\frac{4}{20} + \frac{5}{20} + \frac{1}{20} = \frac{10}{20} = \frac{1}{2} \text{ HALF}$$

2. You are given a sample of $n = 6$ measurements: 2.4, 3.4, 4.7, 4.3, 2.4, 6.8.

(a) (8 points) What is the median, m ?

IN ORDER : 2.4 2.4 3.4 4.3 4.7 6.8

$$m = \frac{3.4 + 4.3}{2} = \frac{7.7}{2} = \boxed{3.85}$$

(b) (8 points) What is the mean, \bar{x} ?

$$\bar{x} = \frac{\sum x_i}{n} = \frac{2.4 + 3.4 + 4.7 + 4.3 + 2.4 + 6.8}{6} = \frac{24}{6} = \boxed{4}$$

(c) (8 points) What is the mode, M ?

$$M = \boxed{2.4} \quad (\text{MOST FREQUENT MEASUREMENT})$$

(d) (8 points) What is the variance, s^2 ?

x_i	$x_i - \bar{x}$	$(x_i - \bar{x})^2$
2.4	$2.4 - 4 = -1.6$	2.56
3.4	$3.4 - 4 = -.6$.36
4.7	$4.7 - 4 = .7$.49
4.3	$4.3 - 4 = .3$.09
2.4	$2.4 - 4 = -1.6$	2.56
6.8	$6.8 - 4 = 2.8$	7.84

ADD UP

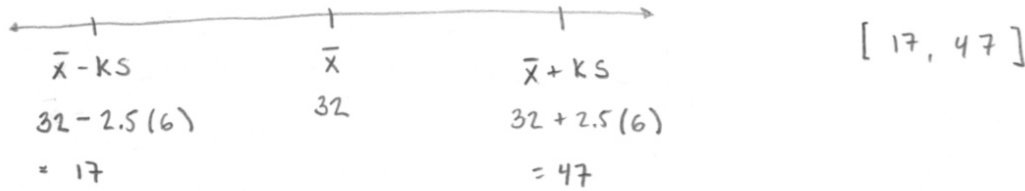
$$s^2 = \frac{\sum (x_i - \bar{x})^2}{n - 1}$$

$$= \frac{13.9}{6 - 1} = \frac{13.9}{5} = \boxed{2.78}$$

(e) (8 points) What is the standard deviation, s ?

$$s = \sqrt{s^2} = \sqrt{2.78} \approx \boxed{1.6673}$$

3. (4 points) A data set consists of 240 measurements with a mean $\bar{x} = 32$ and a standard deviation $s = 6$.
 (a) (10 points) Describe the interval that lies within 2.5 standard deviations of the mean.



- (b) (4 points) Using Chebychev's Theorem, what proportion of the data set lies in this interval?

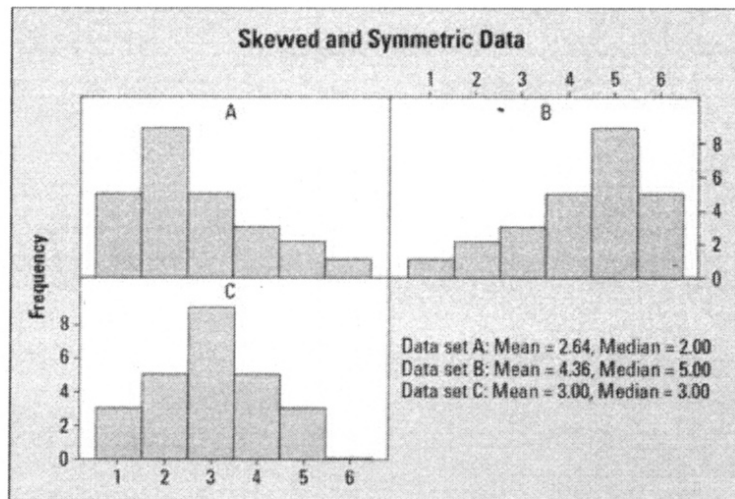
$$\begin{aligned} \text{At least } \left[1 - \frac{1}{k^2} \right] &= \left[1 - \frac{1}{2.5^2} \right] = 1 - \frac{1}{6.25} \approx .84 \\ &= \left[1 - \left(\frac{2}{5}\right)^2 \right] = 1 - \frac{4}{25} = \frac{21}{25} \end{aligned}$$

At least $\frac{21}{25}$
 OR
 At least .84

- (c) (4 points) Using Chebychev's Theorem, how many measurements lie in this interval?

$$\text{At least } \left(\frac{21}{25} \right) \times 240 \approx 201.6 \rightarrow \boxed{\text{At least } 202}$$

4. This question refers to the following three distributions labelled A, B, and C. The mean and median for each distribution is included.



- (a) (4 points) Which of the three distributions is best described as symmetric (A, B, or C)? **C**
- (b) (4 points) Which of the three distributions is best described as left-skewed (A, B, or C)? **B**
- (c) (4 points) Which of the three distributions is best described as right-skewed (A, B, or C)? **A**