

STAT 157 – Practice Test 1

November 16, 2017

Name: Solution Set

Instructor: Patricia Wrean

Total: 30 points

1. (2 points) Consider the following variables concerning a car.

- (a) the year it was built quant, discrete
- (b) the name of the manufacturer qual
- (c) the gas mileage quant, cont
- (d) whether it is manual or automatic qual

Which of these are quantitative? a, c (1)

From the quantitative data, which are continuous? c (1)

2. (3 points) According to the Vancouver Canucks website, the number of goals scored by their top ten scorers in a past year are as follows:

36, 24, 23, 20, 18, 14, 12, 12, 12, 11

State the mean, median, and range of this data set.

mean: 18.2 (1)

median: 16 (1)

range: 25 (1)

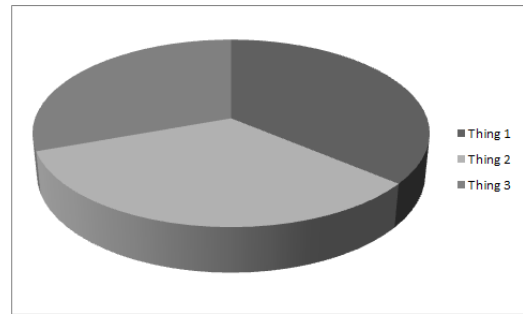
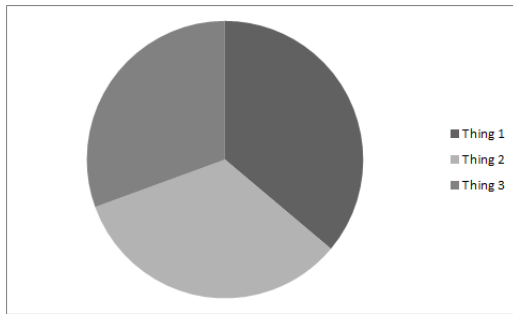
(1/2) [↑] if wrote 11-36

3. (2 points) Consider the following sets of data. Without calculating any values, indicate which set will have the higher standard deviation (or will they be the same?).

- (a) Set 1: 1, 3, 5, 7, 9
 - Set 2: 11, 13, 15, 17, 19
- } same

- (b) Set 1: 1, 4, 5, 6, 9
 - Set 2: 3, 4, 5, 6, 7
- ← Set 1 is higher

4. (3 points) The same data set is graphed in each of the following pie charts.



- (a) Why is the left-hand graph misleading?

It is really difficult to tell which of Thing 2 or Thing 3 is bigger, since we are not very good at comparing angles.

(2)

- (b) Why is the right-hand graph even more misleading?

The 3D view makes the Thing 2 slice even larger than it really is.

(2)

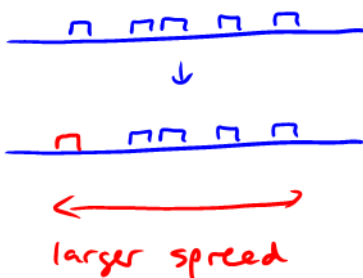
5. (4 points) The Gizmo Store is having a sale of its devices which range in price from \$25 to \$75. Answer the following questions, being as specific as you can!

- (a) If every device is reduced in price by 10%, what happens to the mean, median, range, and standard deviation of the prices?

each quantity is reduced by 10%

(2)

- (b) If, instead, only the cheapest device is reduced in price by 10%, what happens to the mean, median, range, and standard deviation of the prices?



the mean will be lower

the median will be the same

the range and standard deviation will both be higher

(2)

6. (4 points) What survey design is used in each of the following situations?
- (a) A random sample of classes at Camosun is chosen, and every student in that class is asked a question. cluster
- (b) The Camosun student body is divided up into program areas (Civil Engineering, Nursing, etc.) and a random selection of students from each area is asked a question. stratified random
- (c) A certain number of student records are selected randomly from the entire student record database, and those students are asked a question. simple random
- (d) The student records are listed in order by student number. The 11th student and every 25th student thereafter (11th, 36th, 61st, etc.) is asked a question. 1-in-25 systematic
 $-\frac{1}{25}$ if wrote 1-in-k
7. (2 points) State whether the following studies are experimental or observational by circling the correct choice.
- (a) In a recent study, a random sample of children in grades 2 through 4 showed a significant negative relationship between the amount of homework assigned and student attitudes. Expt / Observ
- (b) To examine the effect of pets in stressful situations, researchers recruited 45 women who said they were dog lovers. Fifteen of the subjects were randomly assigned to each of the three groups to do a stressful task alone (the control group), with a good friend present, or with their dog present. The patients mean heart rate during the task was the measure of the effect of stress. Expt / Observ
8. (2 points) The company that stocks Camosun's vending machines wants to survey their customers to find out their opinion of some new products. They therefore invite college faculty and staff to a focus group at lunch hour to try some free snacks.

Do you think that the focus group is a representative sample of the company's customers? Briefly explain, giving at least two different reasons.

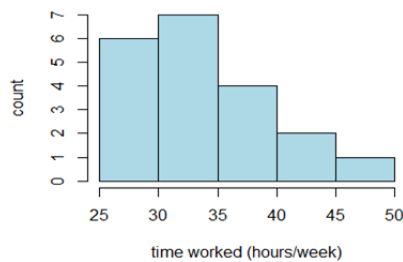
- it's a convenience sample - the people who show up voluntarily to a focus group don't necessarily represent the whole

- students are not represented in the sample

9. (8 points) A random sample of Technology students were asked how many hours they worked last week while on their co-op term, with the following results.

31, 42, 38, 26, 29, 29, 32, 35, 36, 37, 32, 30, 27, 43, 48, 30, 32, 33, 35, 39

The mean and standard deviation of this data are 34.2 and 5.7 hours/week, respectively. The histogram for this data is shown below.



- (a) Describe the shape and symmetry of the histogram. If appropriate, include the direction of the skew.

unimodal, skewed to the right

②

- (b) Fill in the following table by finding the number and percentage of measurements in the given intervals, what percentages you expect to see in these intervals using either Tchebysheff or the Empirical Rule, and whether the actual values agree.

	interval	# points	% points	Tcheby	Empirical	Tcheby works?	Emp works?
$\bar{x} \pm 1s$	28.5 - 39.9	15	75%	≥ 0	$\sim 68\%$	✓	not really
$\bar{x} \pm 2s$	22.8 - 45.6	19	95%	$\geq 75\%$	$\sim 95\%$	✓	✓
$\bar{x} \pm 3s$	17.1 - 51.3	all	100%	$\geq 88.8\%$	$\sim 99.7\%$	✓	✓

④

- (c) Should the percentages obtained in part b) agree with those given by Tchebysheff's theorem? Why or why not?

Tchebysheff - they should and they do (valid for all distributions)

①

- (d) Should the percentages obtained in part b) agree with those given by the Empirical Rule? Why or why not?

Empirical - does not apply since not symmetrical, but okay agreement except at $\bar{x} \pm 1s$

①