Term: 2022   Name: ___Solution Set___

Instructor: Patricia Wrean

MATH 156
Practice Test 4B

Total = $\overline{25}$

- **All of the work on this test must be your own.**

- You may use a scientific calculator. You may not use a calculator with graphing capability or a smartphone app.

GOOD LUCK!

1. (5 points) In a statistics class, volunteers were asked how many hours of video games they played every week and then measured their reaction times in seconds, rounded to the nearest one hundredth of a second. (Reaction time is the time it takes your body to respond to something.) Some of the results are shown in the table below.

hours video games	reaction time
0	0.28
2	0.22
5	0.26
24	0.19

For the following questions, circle the best answer or fill in the blank.

(a) This data is

    (i) univariate

    (ii) bivariate

    (iii) multivariate

1

(b) Name a variable being measured.   _reaction time or hours video games_

(c) For your answer to part (b), this variable is

-2

    (i) qualitative

    (ii) quantitative and discrete   *because rounded*

    (iii) quantitative and continuous

-1

2

(d) The sample is

    (i) a volunteer

    (ii) the hours of video games and reaction time of a volunteer

    (iii) the hours of video games and reaction time of all volunteers

    (iv) the hours of video games and reaction time of all statistics students in the class

1

2. (2 points) For each issue of the Nexus student newspaper, newspaper writers ask five randomly chosen students a question about a current topic, and report their responses.

Do you think that this will give a representative sample of Camosun students? Briefly explain.

no, the sample size is too small

1   *1*

3. (7 points) A small courier company employs a manager at \$35 a hour, an IT specialist at \$40 per hour, eight warehouse workers at \$20 per hour, and two drivers at \$22 a hour.

   (a) Calculate the following.   20   20   20   20   20   20 | 20   20   22   22   35   40

   (i) mean: \$23.25   ①

   (ii) median: *average of 20 and 20*   \$20   ①

   (iii) range: *max − min = 40 − 20*   \$20   ①

   (b) How many employees earn more than the mean wage?

   two   ①

   (c) Which measure of centre best describes a typical wage at this company? Explain briefly.

   median,   *because the mean is pulled* ①
   ①   *towards the two outliers* ①

   (d) The standard deviation of all of these wages is \$6.5 per hour. If everyone at the company gets a raise of \$2 per hour, what will the new standard deviation be?

   Same as before, \$6.5/hour

4. (2 points) The following graph was showed by CNN regarding the current hiring crisis. The smaller pie slice, representing the percentage of restaurant owners concerned about finding workers, is labeled as 57%.

   There is one <u>main</u> reason that this graph is badly designed. Give that reason.

57% should be

more than half of

the graph:
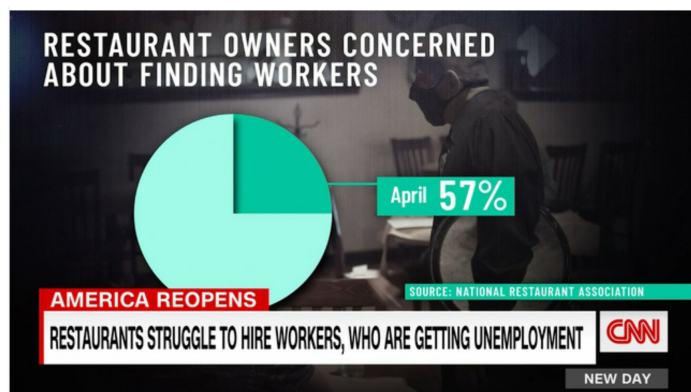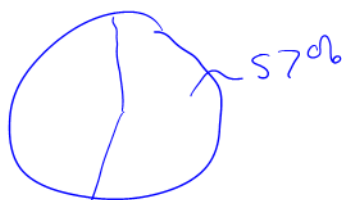
5. (4 points) A sports researcher is studying the resting heart rate for current NHL hockey players. For the following situations, identify the sampling plan used to pick a sample of these hockey players.

   (a) All of the hockey players are sorted into groups based on the position that they play (center, left wing, goalie, etc.), and then a random selection of players from each group are measured.

   _____ stratified _____

   (b) All hockey players currently playing in the NHL are put on a list, and then the 3rd player is selected and then every 15th player after that.

   _____ 1-in-15 systematic _____

6. (2 points) State whether the following study is experimental or observational by circling the correct choice.

   Civil engineers examined the statistics for the number of car accidents at a certain intersection in Victoria that used stop signs. They then turned the intersection into a roundabout and examined the statistics for the number of car accidents at that intersection afterwards.   (Expt)/ Observ

7. (3 points) A survey of a number of the leading brands of cereal shows that the content of potassium per serving is unimodal and symmetrical, with a mean of 92 milligrams and a standard deviation of 4 milligrams.

   (a) Find the interval in which roughly 68% of the measurements will fall. Show your work.

   Empirical   from ____ 88 mg ____ to ____ 96 mg ____

   ~68% within 1 std dev of mean

   so 92 ± 4

   (b) If the potassium conent was found to be bimodal instead, would the interval that you found in part (a) still be valid?   Yes /(No)

   Empirical only works for
   unimodal, roughly symmetrical