50/50

Summer 2018 **Last Name** Dulaney

Math 54: Test 1 **First Name** Stewart

Part I (Work out): *For each of the following show all necessary work.*

1. **[10 each points]** Dr.Paul Oswiecmiski randomly selected 40 of his 20-to29-year old patient and obtained the following data regarding their serum HDL Cholesterol

70	56	48	48	53	52	66	48
36	49	28	35	58	62	45	60
38	73	45	51	56	51	46	39
56	32	44	60	51	44	63	50
46	69	53	70	33	54	55	52

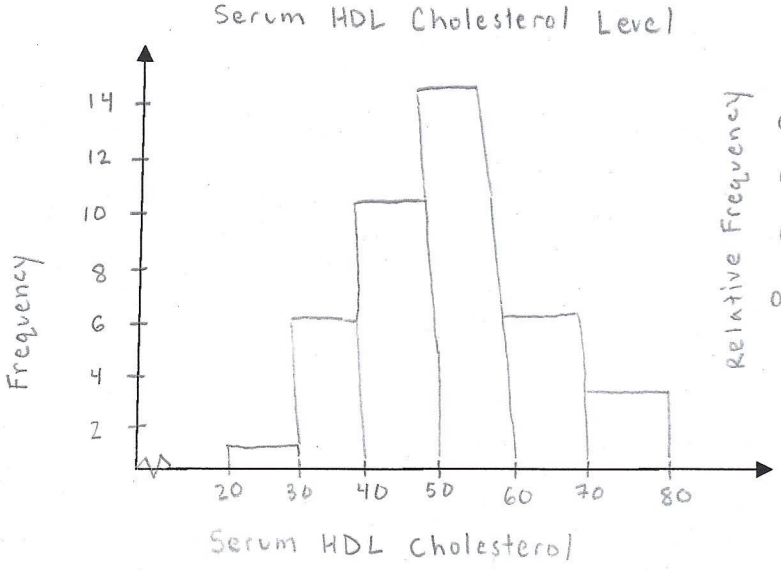
With the first class having a lower class limit of 20 and a class width of 10:

a. Construct frequency distribution and relative frequency distribution.

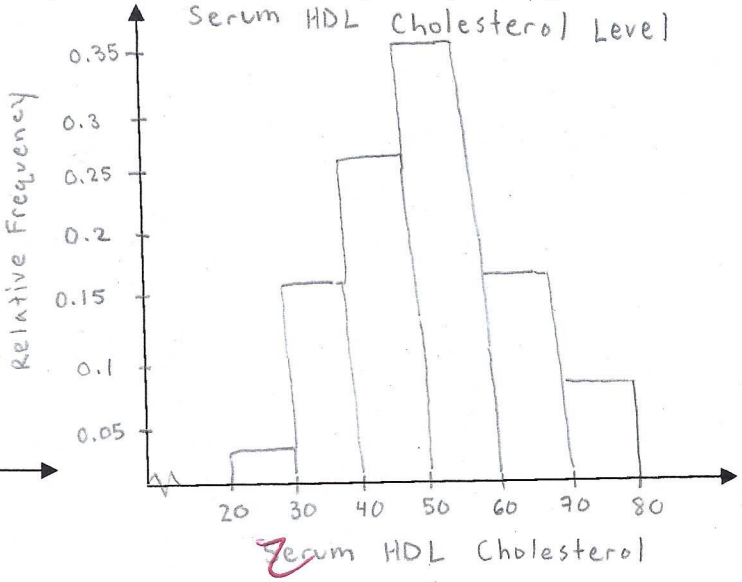
Class	Tally	Frequency	Relative frequency
20 - 29	I	1	1/40 = 0.025
30 - 39	~~HHT~~ I	6	6/40 = 0.150
40 - 49	~~HHT~~ ~~HHT~~	10	10/40 = 0.250
50 - 59	~~HHT~~ ~~HHT~~ IIII	14	14/40 = 0.350
60 - 69	~~HHT~~ I	6	6/40 = 0.150
70 - 79	III	3	3/40 = 0.075
	2	2	2

6

b. frequency histogram and describe the shape.



c. a relative frequency histogram.



The distribution is roughly bell shaped (symmetric).

4

2.[2 points each] The high temperatures (in degrees Celsius) each day over a three week period were as follows: 17, 18, 20, 22, 21, 19, 16, 15, 18, 20, 21, 21, 22, 21, 19, 20, 19,17, 16, 16, 17. Compute the

a. Mean b. Median c. Mode.

$\bar{x} = \frac{\sum x_i}{n} = \frac{17+18+20+22+21+19+16+15+18+20+21+21+22+21+19+20+19+17+16+16+17}{21}$

$\bar{x} = \frac{395}{21}$

$\bar{x} = 18.81°C$ 2

In ascending order: 15, 16, 16, 16, 17, 17, 17, 18, 18, 19, 19, 19, 20, 20, 20, 21, 21, 21, 21, 22, 22

(1, 3, 3, 2, 3, 11th value, 3, 4, 2)

The median is the $\frac{n+1}{2} = \frac{21+1}{2} = \frac{22}{2}$ = 11th value. ∴ Median = M = 19°C 2

The mode is 21°C, which occurs 4 times.

d. Range

Range = R = 22 − 15

Range = 7°C 2

e. Standard deviation (Use calculator)

s = 2.16°C 2

8

3. **[10 points]** The following data represents the length of time (in minutes) between eruptions of Old Faithful in Yellowstone National Park

Time in minutes	Frequency (f)	Midpoint(x_m)	$f \times (x_m)$
40-49	8	45	360
50-59	44	55	2420
60 - 69	23	65	1495
70 - 79	6	75	450
80 - 89	107	85	9095
90 - 99	11	95	1045
100 - 109	1	105	105
	[illegible]		

$\Sigma f_i = 200$ $\Sigma x_i f_i = 14970$

a. Complete the table

b. Approximate the mean of the length of time between eruptions (i.e. find mean of grouped data).

$$\mu = \frac{\Sigma x_i f_i}{\Sigma f_i} = \frac{14970}{200} = 74.85 \text{ min}$$

c. Use calculator to approximate standard deviation of grouped data.

$\sigma = 13.56$ min

(from TI-84 Plus)

10

4. **a.**[**3 points**] A student earned grades at the end of semester as shown below

Course	Credit hours	Grade
Math	4	B
English	5	B
Biology	1	A
History	5	C
Chemistry	4	D

The grading system assigns quality points to letter grades as follows:
A = 4, B = 3, C = 2, D = 1, and F = 0. Compute the grade point average (GPA) and round the result to two decimal places

$$GPA = \bar{x}_w = \frac{4(3) + 5(3) + 1(4) + 5(2) + 4(1)}{4 + 5 + 1 + 5 + 4} = \frac{45}{19} = 2.37$$

b. [**2 points**] Michael and Kevin want to buy chocolate. They can't agree on whether they want cholate-covered almonds, Chololate-covered peanut or chocolate-covered raisin. They agree to create a mix.They bought 4 pounds of chocolate-covered almond at $3.50 per pound, 3 pound of chocolate-covered peanuts for $2.75 per pound, and 2 pounds of chocolate-covered raisins for $2.25 per pound. Determine the cost per pound of the mix.

$$\text{Cost per pound} = \bar{x}_w = \frac{4(3.50) + 3(2.75) + 2(2.25)}{4 + 3 + 2} = \frac{26.75}{9} = \$2.97 / lb$$

5

5.[**2 points each]** Stock-Brocker records the number of clients she saw each day over an eleven-day period. The data are shown below.

Data: 33, 38, 43, 30, 29, 40, 51, 42, 23, 31 and 32

a. Determine the 5- number summary: Min,Q1, Q2, Q3, Max

Min = 23
Q_1 = 30
Q_2 = 33
Q_3 = 42
Max = 51

2

23, 30, 33, 42, 51

b. Compute the inter quartile (IQR)

$IQR = Q_3 - Q_1$
$= 42 - 30$
$=$ 12 clients

2

c. Determine the upper and lower fences

Lower fence $= Q_1 - 1.5(IQR)$
$= 30 - 1.5(12)$
$=$ 12 clients

Upper Fence $= Q_3 + 1.5(IQR)$
$= 42 + 1.5(12)$
$=$ 60 clients

2

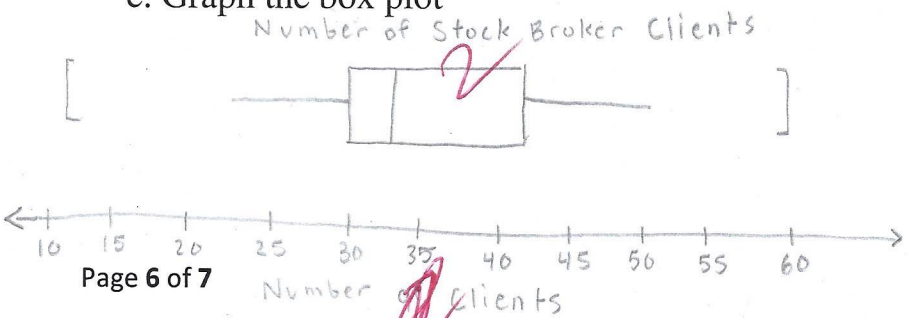
d. Determine if any outlier

Min > Lower fence
Max < Upper fence

2

∴ No outliers

e. Graph the box plot



2

10

6.[1 points each]

Determine if the following variable is qualitative or quantitative

a. The student ID number a. qualitative

b. The speed of a car on a Boston tollway during rush hour traffic is b. quantitative

Determine if the following numerical summary is parameter or statistic.

c. The average score for a class of 28 students taking a calculus midterm exam was 72%. c. parameter

Determine whether the study depicts an observational study or an experiment.

d. Rates with cancer are divided into two One group receives 5 milligram (mg) of a medication that is thought to fight cancer, and the other receives 10 mg. After 2 years the spread of the cancer is measured. d. experiment

e. Given stem-leaf-plot

1	45678
2	899023876
3	741235
4	432187
5	0780219876

Find the range e. 45

Range = R = 59 − 14 = 45

5