

First Mid-Term Exam - QUA 107

Saturday 21/12/1434*

Time 10:00AM – 11:00AM

Name		Section No.	
ID No.		Serial No.	

Question Number	Your Answer
1	
2	
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11	
12	
13	
14	
15	

Choose the correct answer to the following questions:

1. The incomes of a group of 50 loan applicants are obtained. Which level of measurement is income?

- A) Nominal
- B) Ordinal
- C) Interval
- D) Ratio**

2. A questionnaire contained a question regarding marital status. The respondent checked either single, married, divorced, separated or widowed. What is the scale of measurement for this question?

- A) Ratio
- B) Interval
- C) Ordinal
- D) Nominal**

3. The monthly salaries of a sample of 100 employees were rounded to the nearest ten dollars. They ranged from a low of \$1,720 to a high of \$2,130. If we want to condense the data into seven classes, what is the most convenient class interval?

- A) \$ 60**
- B) \$100
- C) \$150
- D) \$200

$$i \geq (H-L)/k \Rightarrow i \geq (1720-2130)/7 = 58.59 \Rightarrow 60$$

4. For a data set, half of the observations are always greater than the _____ .

- A) Median**
- B) Mode
- C) Mean
- D) None of the above

5. What statistics are needed to draw a box plot?

- A) Minimum, maximum, median, first and third quartiles**
- B) Median, mean and standard deviation
- C) A median and an interquartile range
- D) A mean and a standard deviation.

6. A sample distribution of hourly earnings in Paul's Cookie Factory is:

Hourly Earnings	\$6 up to \$9	\$9 up to \$12	\$12 up to \$15
Numbers	16	42	10

The limits of the class with the smallest frequency are:

- A) \$ 6.00 and \$9.00
- B) \$12.00 and up to \$14.00

- C) \$11.75 and \$14.25
D) \$12.00 and up to \$15.00

- Refer to the following distribution of commissions:

Monthly commissions	Class Frequencies
\$ 600 up to \$800	3
800 up to 1,000	7
1,000 up to 1,200	11
1,200 up to 1,400	22
1,400 up to 1,600	40
1,600 up to 1,800	24
1,800 up to 2,000	9
2,000 up to 2,200	4

7. What is the cumulative frequency for the class of \$1,600 - \$1,800?
 A) 20 %
 B) 89.2 %
 C) 24
 D) 107

$$C=24/(3+7+11+22+40+24+9+4)=0.2$$

8. The following are the weekly amounts of welfare payments made by the federal government to a sample of six families: \$139, \$136, \$130, \$136, \$147 and \$136. What is the range?
 A) \$0
 B) \$14
 C) \$52
 D) \$17

$$\text{Range} = \text{largest value} - \text{Smallest value}$$

$$R = 147 - 130 = 17$$

9. Ten experts rated a newly developed chocolate chip cookie on a scale of 1 to 50. Their ratings were: 34, 35, 41, 28, 26, 29, 32, 36, 38 and 40. What is the mean deviation?
 A) 8.00
B) 4.12
 C) 12.67
 D) 0.75

MEAN DEVIATION

$$MD = \frac{\sum |X - \bar{X}|}{n}$$

[3-7]

$$\text{Mean}=(34+35+41+28+26+29+32+36+38+40)/10=339/10=33.9$$

$$\text{MD}=(0.1+1.1+7.1+5.9+7.9+4.9+1.9+2.1+4.1+6.1)/10=4.14$$

10. The weights (in grams) of the contents of several small bottles are 4, 2, 5, 4, 5, 2 and 6. What is the sample variance?

A) 6.92

B) 4.80

C) 1.96

D) 2.33

SAMPLE VARIANCE

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

[3-10]

$$\bar{X} = \frac{\sum X}{n}$$

So the mean =26/7=3.71

X	4	2	5	4	5	2	6	26
$X - \bar{X}$	0	-2	1	0	1	-2	2	0
$(X - \bar{X})^2$	0	4	1	0	1	4	4	14

$$S^2=14/(7-1)=2.33$$

Use the following to answer questions 11-13:

A company's human resource department was interested in the average number of years that a person works before retiring. The sample of size 11 follows:

23, 18, 20, 16, 13, 23, 19, 19, 24, 19, 25

11. What is the mode?

A) 19

B) 27

C) 20

D) 23

12. What is the median?

A) 13

B) 19

C) 21

D) 23

13,16,18,19,19,19,20,23,23,24,25

13. What is the third quartile?

- A) 13
- B) 18
- C) 21
- D) 23**

13,16,18,19,19,19,20,23,23,24,25

A random survey of 50 married men gave the following distribution of hours spent per week doing unpaid household work:

Hours (Class)	Number men (f)	M	Mf	$(M - \bar{X})$	$(M - \bar{X})^2$	$f(M - \bar{X})^2$
0 up to 5	10	2.5	25	-10.7	114.49	1144.9
5 up to 10	12	7.5	90	-5.7	32.49	389.88
10 up to 15	9	12.5	112.5	-0.7	0.49	4.41
15 up to 20	5	17.5	87.5	4.3	18.49	92.45
20 up to 25	8	22.5	180	9.3	86.49	691.92
25 up to 30	6	27.5	165	14.3	204.49	1226.94
	50		660			3550.5

Complete the above table to answer questions 14 & 15.

14. The mean of the frequency distribution table is equal to:

- A) 13.2**
- B) 11.2
- C) 18.2
- D) 21

$$\bar{X} = \frac{\sum fM}{n}$$

$$\text{Mean} = 660/50 = 13.2$$

15. The variance equal to:

- A) 8.51
- B) 5.98
- C) 72.46**
- D) 63.46

STANDARD DEVIATION, GROUPED DATA

$$s = \sqrt{\frac{\sum f(M - \bar{X})^2}{n - 1}}$$

[3-13]

$$S^2 = 3550.5 / (50 - 1) = 72.46$$

Best Wishes