

Final answers should have accuracy to 6 decimal places. Show some work how medians and means are computed. *Giving only the answer will bring you few points.*

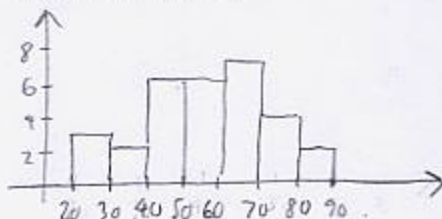
1. (8pts) A proposal is out to turn the stretch highway 641 between Murray and Paris into a four-lane road. To gauge support for the idea, county officials decide to survey the population. Comment on whether each of the following will produce a good random sample of the counties' (Calloway & Henry) populations.

- Surveying the members of the Murray and Paris chambers of commerce.
- Surveying homeowners up to 100 yards from the proposed route.
- Picking random names from counties' voter lists, and surveying those people by phone.
- Surveying highway 641 drivers crossing the Kentucky-Tennessee line.

- a) Not a good sample - too small and biased toward the project, due to commercial benefits
- b) Not a good sample - may be biased against construction due to increased traffic and noise near their homes.
- c) Represents a wide population of the counties, pretty good sample
- d) Not a good sample - may be biased toward the project, since they probably drive on the road often. Also may be from outside the counties.

2. (22pts) A customer service call center would like to see whether it is experiencing a high volume of calls in order to hire more people. The number of incoming calls over 30 days is recorded, with results below. Do the following:

- Construct a grouped frequency distribution with first class 20-29.
- Draw a histogram for the data
- Enter a representative value for each interval.
- Estimate the mean of the data based on the frequency distribution.
- Find the actual mean and compare your answer to e).



23, 45, 57, 63, 54, 43, 33, 21, 55, 62, 88, 67, 44, 56, 85, 72, 77, 66, 69, 45, 22, 39, 54, 64, 71, 69, 58, 47, 74, 49

Class	Frequency	Rep. value
20-29	3	24.5 = (20+29)/2
30-39	2	34.5
40-49	6	44.5
50-59	6	54.5
60-69	7	64.5
70-79	4	74.5
80-89	2	84.5
30		

$$\begin{aligned} \text{Estimated mean } \bar{x} &= \frac{3 \cdot 24.5 + 2 \cdot 34.5 + \dots + 4 \cdot 74.5 + 2 \cdot 84.5}{30} \\ &= \frac{1655}{30} = 55.166667 \end{aligned}$$

$$\begin{aligned} \text{Actual mean} &= \frac{23 + 45 + 57 + \dots + 47 + 74 + 49}{30} \\ &= \frac{1672}{30} = 55.733333 \end{aligned}$$

3. (10pts) A day care center examines how many babies are left to their care every day over a 20-day period (four working weeks) They number listed below.

a) Find the midrange of the data.

2, 3, 5, 7, 8, 8, 7, 6, 5, 4, 3, 3, 5, 5, 7, 6, 6, 8, 6, 5

b) Find the median of the data.

2, 3, 3, 3, 4, 5, 5, 5, 5, 5, 6, 6, 6, 6, 7, 7, 7, 8, 8, 8

c) Find the mean of the data.

↑ ↑  
10th 11th

a)  $\frac{2+8}{2} = 5$

b)  $\frac{5+6}{2} = 5.5$

c)  $\frac{1 \cdot 2 + 3 \cdot 3 + 1 \cdot 4 + 5 \cdot 5 + 4 \cdot 6 + 3 \cdot 7 + 3 \cdot 8}{20} = \frac{109}{20} = 5.45$

4. (20pts) Over 40 days, a restaurant counts how many times a new dish is ordered every day. The numbers are shown below. Do the following:

a) Draw a histogram for the data.

b) Find the midrange of the data.

c) Find the median of the data.

d) Find the mean of the data.

Times ordered	Frequency (days)
1	3
2	5
3	6
4	5
5	9
6	8
7	4
	<hr/> 40



b) midrange =  $\frac{1+7}{2} = 4$

c)  $\frac{3}{1 \rightarrow 1}, \frac{5}{2 \rightarrow 2}, \frac{6}{3 \rightarrow 3}, \frac{5}{4 \rightarrow 4}, \frac{9}{5 \rightarrow 5}, \frac{8}{6 \rightarrow 6}, \frac{4}{7 \rightarrow 7}$   
 ↑     ↑     ↑     ↑     ↑     ↑  
 3rd 8th 14th 19th 24th 28th

20th & 21st  
5 5

$\frac{5+5}{2} = 5$

d)  $\bar{x} = \frac{3 \cdot 1 + 5 \cdot 2 + 6 \cdot 3 + 5 \cdot 4 + 9 \cdot 5 + 8 \cdot 6 + 4 \cdot 7}{40}$

$= \frac{172}{40} = 4.3$