**Math E-3**

**ASSIGNMENT 4 SOLUTIONS**

**Total possible points = 51**

**Round to 1 decimal point (“d.p.”) for all problems, unless otherwise specified.**

Show your work for full or partial credit.

**Problem 1**

Here is a similar data set to the one given in Chapter 4. Draw by hand the histogram indicated below. It will help if you set up some kind of tally. Thus, we will award **1 point** **extra credit for setting up a neat stem and leaf display.**

In a large room of people, the age of each person was obtained. Here are the data:

26 43 18 42 12 65 30 18

37 23 36 47 42 16 51 41

29 15 29 31 47 54 41 34

43 22 50 43 38 32 46 60

**Extra Credit:** Stem and Leaf Diagram: **1 point**

First Pass:

**Stem Leaf**

1 **8 2 8 6 5**

**2 6 3 9 9 2**

**3 0 7 6 1 4 8 2**

**4 3 2 7 2 1 7 1 3 3 6**

**5 1 4 0**

**6 5 0**

Second Pass:

**Stem Leaf**

1 **2 5 6 8 8**

**2 2 3 6 9 9**

**3 0 1 2 4 6 7 8**

**4 1 1 2 2 3 3 3 6 7 7**

**5 0 1 4**

**6 0 5**

Make a histogram of this data using a **class interval size of 5**, **starting at 10. (HINT: refer to bottom of page 1 of the reading). 4 points**

**For problems 2 -6**

The histogram below shows the number of students in an incoming freshman class of a local university receiving financial aid and the average income of their families.

2. Can you find the exact number of freshman receiving financial aid? Why or why not?

No. It is difficult to read the exact number of households on the vertical axis. Alternate answer: You can get a pretty close estimate. **1 point**

3. *Estimate* the number of students receiving financial aid. That is, give an approximate size.

60+85+91+63+32+21+27+19+15+7+4+2+1=427 **2 points**

4. What is missing from this graph?

A title  **1 point**

5. Describe its shape?

Skewed right **1 point**

6. Estimate the average income of the students' families' receiving financial aid? (Answers will differ.)  **2 points**

60(40)+85(50)+91(60)+63(70)+32(80)+21(90)+27(100)+19(110)+15(120)+7(130)+4(140)+2(150)+1(160)427

29490 = 69.06 \*1000(income was stated in thousands) = $69,060 mean income of families

427

**Problems 7-14**

Grades for Accounting 101 quiz. The data below gives the grades on an accounting quiz. The highest grade was a 90 and the lowest, a 20.

**Frequency**

**Grade # of Students who received that grade**

20 2

50 5

60 7

70 13

80 4

90 1

7. Draw or create the histogram for this distribution of grades. **Do not forget labels, including a title. 3 points**

8. Describe its shape.

Skewed left **1 point**

Find the measures of center:

9. Find the mean grade. **Round answer to 1 dp (e.g. if you got an answer of 36.325, you would round to 36.3).**

2(20)+5(50)+7(60)+13(70)+4(80)+1(90) = 2030 = 63.44 =63.4 **2 points**

32 32

10. Find the median grade

32/2= 16. Since even amount of data, average 16th and 17th position.

Both the 16th and 17th positions are 70 so the median is 70. **2 points**

11. Find the mode

70 **1 point**

12. Which is greater, the mean or the median? Why? **2 points**

The median is greater because the mean is pulled in the direction of the skew to the left.

Find the measures of spread:

13. range

90-20=70 **1 point**

14. Calculate the standard deviation. (Note: You must do the calculation of the standard deviation as we did in class. I have set up the table for you to get you started. However, you must be able to set it up on an exam without benefit of notes. **Round end result to 1 dp. 4 points**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | (X – x-bar) | (X – x-bar)2 | f | (X – x-bar)2  \* f |
| 20 | 20-63.4=-43.4 | (-43.4)2=1883.56 | 2 | 3767.12 |
| 50 | 50-63.4=-13.4 | (-13.4)2= 179.56 | 5 | 897.8 |
| 60 | 60-63.4 = -3.4 | (-3.4)2= 11.56 | 7 | 80.92 |
| 70 | 70-63.4 = 6.6 | (6.6)2= 43.56 | 13 | 566.28 |
| 80 | 80-63.4 = 16.6 | (16.6)2= 275.56 | 4 | 1102.24 |
| 90 | 90–63.4 =26.6 | (26.6)2= 707.56 | 1 | 707.56 |
|  |  |  | 32 | 7121.92 |

= = 14.91844496 = **14.9**

**Problems 15-18**

The table below describes the parking rates per day at 31 different parking garages in and around the city of Boston.

Parking rate Number of garages at that price

$16 3

$18.50 6

$21 8

$22.5 5

$24 4

$26 3

$45 2

15. Draw or create the histogram for these data. **3 points**

16. Calculate the mean parking rate at these garages. **Round to 2 dp.**

3(16) + 6(18.50) + 8(21) + 5(22.50) + 4(24) +3(26) +2(45)

31

703.50 = 22.69354839= $22.69 **2 points**

31

17. Calculate the median parking rate at these garages.

31/2 =15.5 round up to 16. Look at 16th position for median.

16th position = $21 **2 points**

18. What percentage of the parking garages had rates that were less than the mean parking rate? **Round to 1 dp. 2 points**

Mean parking rate =$22.69

Number of parking garages which had a lower price = 3+6+8+5 =22

Percentage = 22/31 = .709677419 = 70.9677419% = 71.0%

Problems 19-25

Given: the following frequency table of the heights of women on a college soccer team.

Height in inches Frequency

65 1

66 4

67 6

68 11

69 7

71 5

72 1

19. Draw the histogram for these data. **3 points**

20. Describe its shape.

Normal **1 point**

Find the measures of center:

21. mean **Round to 1 dp.**

1(65) + 4(66) +6(67) + 11(68) + 7(69) +5(71) + 1(72) = 2389 = 68.25714286=68.3 35 35

**2 points**

22. median

35/2 = 17.5 round up to 18

Look at 18th position for median

18th position = 68 **2 points**

23. mode

68 **1 point**

Find the measures of spread, height (in inches).

24. range

72-65 = 7 inches **1 point**

25. Calculate standard deviation. **Round final result to 1 dp. 4 points**

(note: rounding will affect some figures slightly)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | (X – x-bar) | (X – x-bar)2 | f | (X – x-bar)2  \* f |
| 65 | 65-68.3=-3.3 | (-3.3)2=10.61 | 1 | 10.61 |
| 66 | 66-68.3=-2.3 | (-2.3)2=5.09 | 4 | 20.38 |
| 67 | 67-68.3=-1.3 | (-1.3)2=1.58 | 6 | 9.48 |
| 68 | 68-68.3=-0.3 | (-0.3)2=0.07 | 11 | 0.73 |
| 69 | 69-68.3=0.7 | (0.7)2=0.55 | 7 | 3.86 |
| 71 | 71-68.3=2.7 | (2.7)2=7.52 | 5 | 37.62 |
| 72 | 72-68.3=3.7 | (3.7)2=14.01 | 1 | 14.01 |
| Total |  |  | 35 | 96.69 |

= = 1.662061665 = **1.7**