Math E-3

ASSIGNMENT 4 **Total possible points = 51**

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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 the histogram indicated below. It will help if you set up some kind of tally. 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:

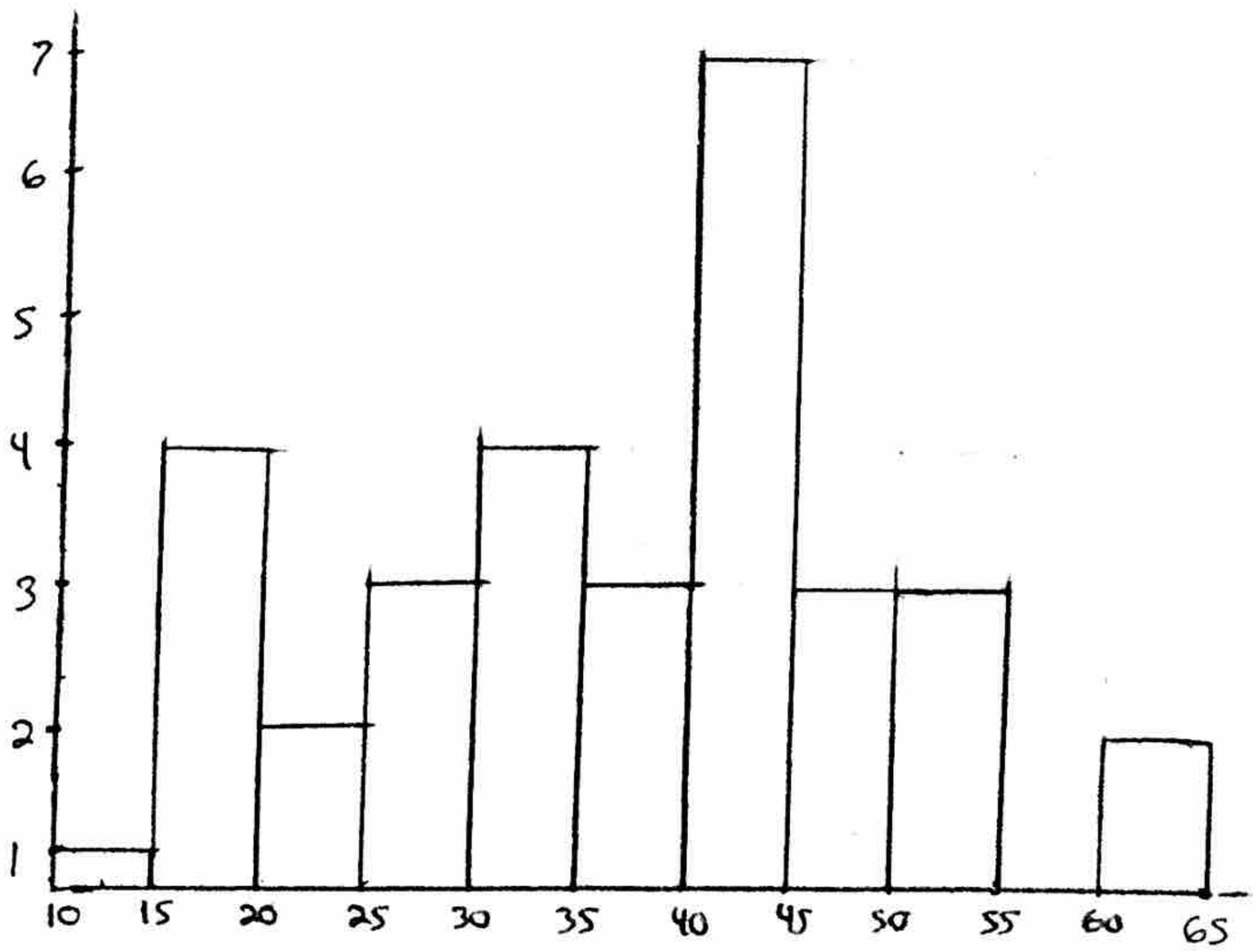
Steam	leaf
1	2 5 6 8 8
2	2 3 6 9 9
3	0 1 2 4 6 7 8
4	1 1 2 2 3 3 3 6 7 7
5	0 1 4
6	5 0

Second Pass:

Count	Stem	Leaf
5	1	2 5 6 8 8
5	2	2 3 6 9 9
7	3	0 1 2 4 6 7 8
10	4	1 1 2 2 3 3 3 6 7 7
3	5	0 1 4
+ 2	6	5 0
10		

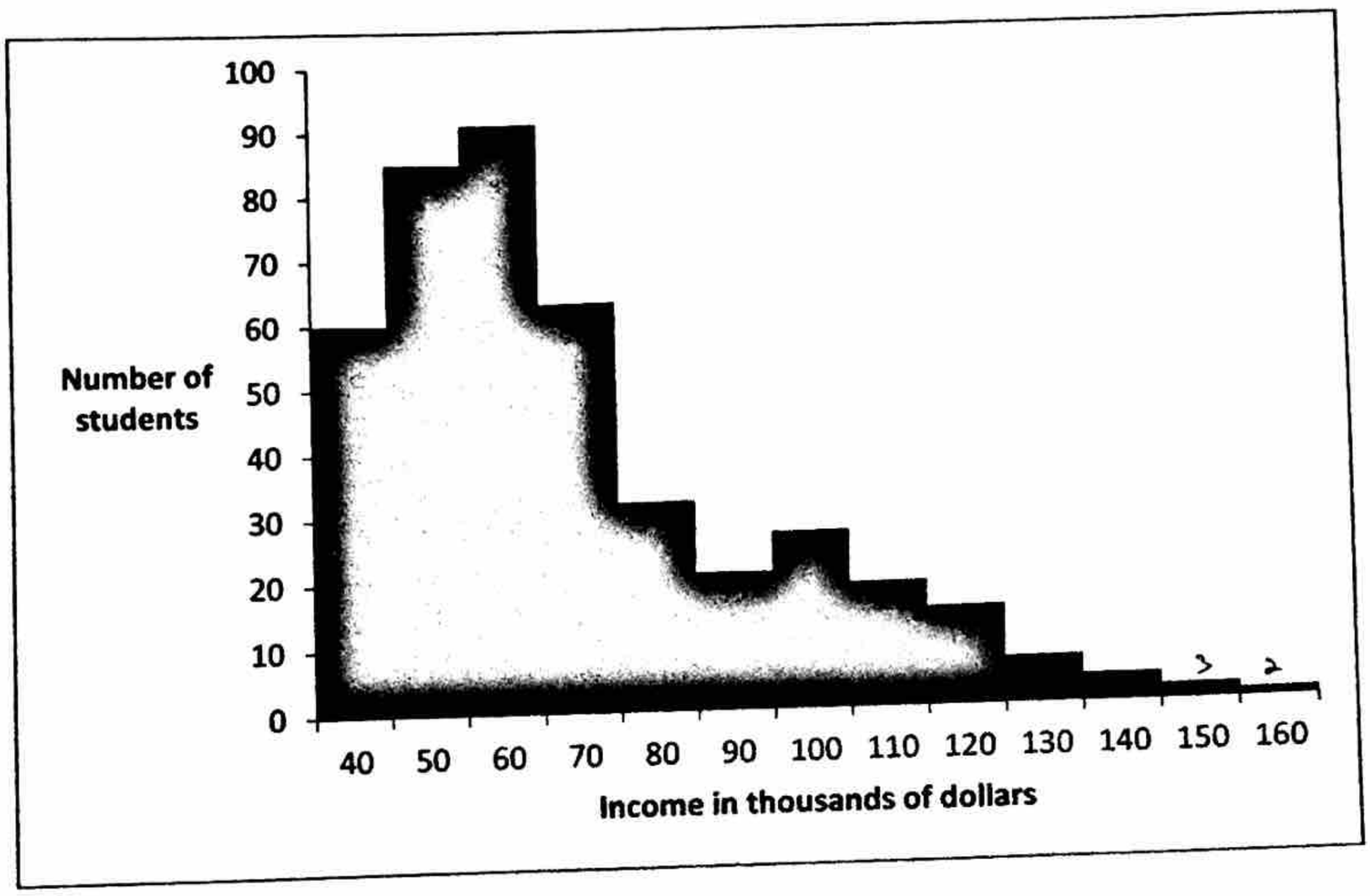
Draw a histogram of this data using a **class interval size of 5, starting at 10. (HINT: refer to bottom of page 1 of the reading).** **4 points**

Class	Freq
10-14	1
15-19	4
20-24	2
25-29	3
30-34	4
35-39	3
40-44	7
45-49	3
50-54	3
55-59	0
60-64	2



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?

It is difficult to find the "exact" number of students receiving financial aid because of the absence of number of students between the intervals of 10 (ex. 10-20: 10, 11, 12, 13...) **1 point**

3. *Estimate* the number of students receiving financial aid. **2 points**

436 = 60 + 85 + 91 + 63 + 33 + 22 + 28 + 20 + 16 + 8 + 5 + 3 + 2
students

4. What is missing from this graph? **1 point**

How many student families receiving financial aid that are < 35 thousand and > 165 thousand dollars.

5. Describe its shape? Skew right, the tail is located to the right of histogram.

1 point

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

2 points

$$70.1147 \approx \frac{\left(60(40)+85(50)+91(60)+63(70)+33(80)+22(90)+28(100)+20(110)+16(120)+8(130)+5(140)+3(150)+2(160)\right)}{486 \text{ students}}$$

$\bar{x} = 70.1$

Estimated average income is $70,000 of student families receiving financial aid.

-1
95

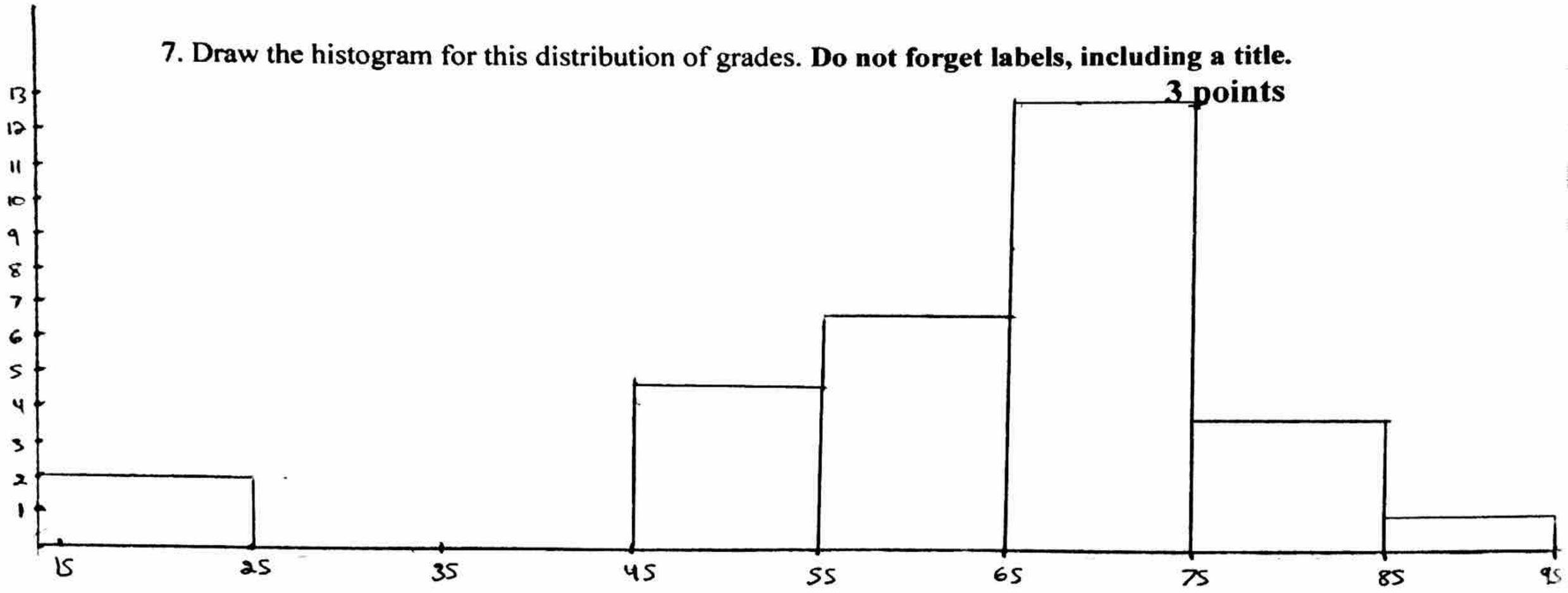
Problems 7-14

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 the histogram for this distribution of grades. **Do not forget labels, including a title.**

3 points



8. Describe its shape.

It looks normal skewing to the left a bit. My final answer is normal.

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).** $n=32$

2 points

$$63.4375 \approx \frac{2(20)+5(50)+7(60)+13(70)+4(80)+1(90)}{32}$$

$\bar{x}=63.4$

10. Find the median grade

2 points

$\frac{32}{2}=16$

Median is 70

11. Find the mode **1 point**

Mode is 70

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

The median score of 70 is greater than the mean score of 63.4 because the number of students decrease as grades increase. Thus decreasing the mean average score.

Find the measures of spread:

13. range **1 point**

$70 = 90 - 20$

Range is 70

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 <u>final</u> answer to 1 dp.**

4 points

X	(X – x-bar)	$(X - \text{x-bar})^2$	f	$(X - \text{x-bar})^2 * f$
20	$20 - 63.4 = -43.4$	$(-43.4)^2 = 1883.6$	2	$1883.6 \cdot 2 = 3767.1$
50	$50 - 63.4 = -13.4$	$(-13.4)^2 = 179.56$	5	$179.56 \cdot 5 = 897.8$
60	$60 - 63.4 = -3.4$	$(-3.4)^2 = 11.56$	7	$11.56 \cdot 7 = 80.92$
70	$70 - 63.4 = 6.6$	$(6.6)^2 = 43.56$	13	$43.56 \cdot 13 = 566.28$
80	$80 - 63.4 = 16.6$	$(16.6)^2 = 275.56$	4	$275.56 \cdot 4 = 1102.2$
90	$90 - 63.4 = 26.6$	$(26.6)^2 = 707.56$	1	$707.56 \cdot 1 = 707.56$

$n = 32$

$\bar{x} = 63.4$

$\Sigma = 7121.9$

$\sqrt{\frac{7121.9}{2}} = 14.9184 = 14.9$

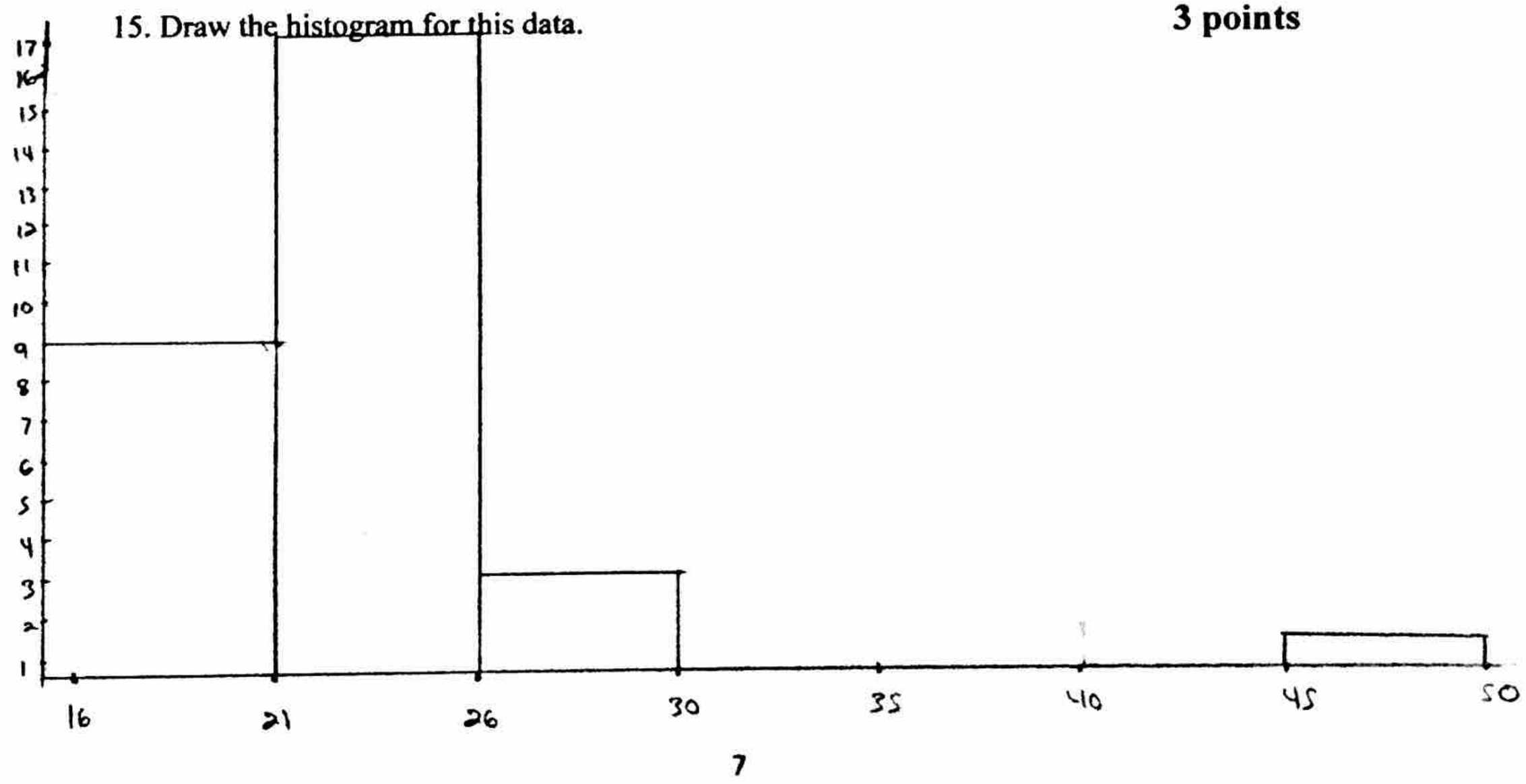
$\sigma = 14.9$

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] 16-20 = 9 → Histogram bars are merged to save paper space due to outlier of $45. I understand histogram for class interval of 2.
$18.50	6]
$21	8]
$22.5	5] 21-25 = 17 Converted class interval to 5 instead.
$24	4]
$26	3 → 26-30 = 3
$45	2 → 45-49 = 2

15. Draw the histogram for this data. **3 points**



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

$n = 31$

$$22.6935 \approx \frac{3(16) + 6(18.5) + 8(21) + 5(22.5) + 4(24) + 3(26) + 2(45)}{31}$$

$\bar{x} = \$22.69$

17. Calculate the median parking rate at these garages. **2 points**

$\frac{31}{2} = 15.5 = 16$

Median parking rate is $21.00.

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

$$70.9677 \approx \left(\frac{22}{31}\right) 100$$

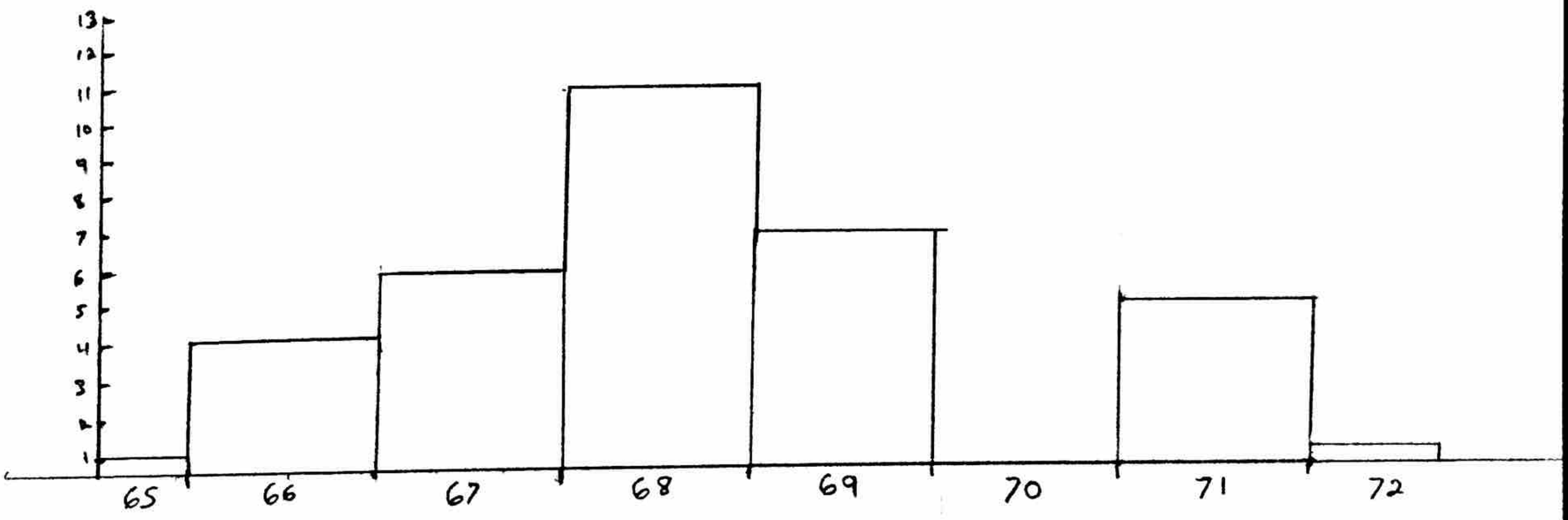
71.0% of parking garages had rates that were less than $22.69.

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. Shape is normal. **1 point**

Find the measures of center:

$n = 35$

21. mean **Round to 1 dp.** **2 points**

$$68.2571 \approx \frac{1(65) + 4(66) + 6(67) + 11(68) + 7(69) + 5(71) + 1(72)}{35}$$

$\bar{x} = 68.3$

22. median **2 points**

$\frac{35}{2} = 17.5 = 18$

Median = 68

23. mode **1 point**

Mode is 68.

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

24. range **1 point**

$7 = 72 - 65$

Range is 7

25. Calculate standard deviation. **Round <u>final</u> answer to 1 dp.** **4 points**

X	(X – x-bar)	$(X - \text{x-bar})^2$	f	$(X - \text{x-bar})^2 * f$
65	65 - 68.3 = -3.3	$(-3.3)^2 = 10.89$	1	$10.89 \cdot 1 = 10.89$
66	66 - 68.3 = -2.3	$(-2.3)^2 = 5.29$	4	$5.29 \cdot 4 = 21.16$
67	67 - 68.3 = -1.3	$(-1.3)^2 = 1.69$	6	$1.69 \cdot 6 = 10.14$
68	68 - 68.3 = -.3	$(-.3)^2 = .09$	11	$.09 \cdot 11 = .99$
69	69 - 68.3 = .7	$(.7)^2 = .49$	7	$.49 \cdot 7 = 3.43$
71	71 - 68.3 = 2.7	$(2.7)^2 = 7.29$	5	$7.29 \cdot 5 = 36.45$
72	72 - 68.3 = 3.7	$(3.7)^2 = 13.69$	1	$13.69 \cdot 1 = 13.69$
			$= 35$	$\Sigma = 96.75$

$$1.66261 = \sqrt{\frac{96.75}{35}}$$

$\sigma = 1.7$

Standard deviation is 1.7