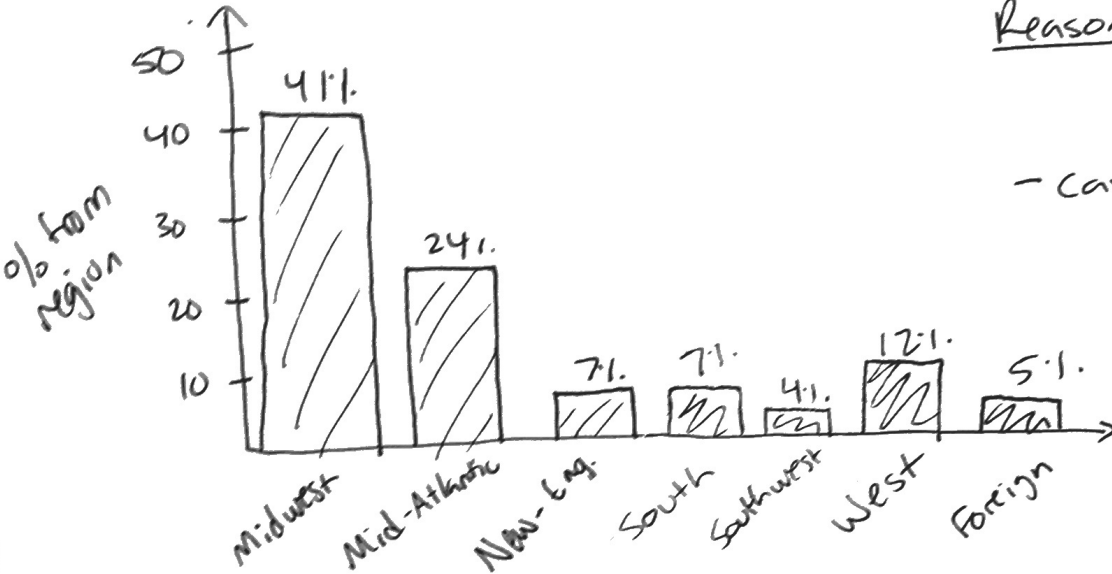


(1-2) Consider data from 970 students enrolled at a college. Draw an appropriate graph for each data set. Justify your choice of graph. Use a different graph for each question.

1. Of the students described, 41% came from the Midwest, 24% from Mid-Atlantic states, 7% from each of New England and the South, 4% from the Southwest, 12% from the West and 5% from foreign countries.



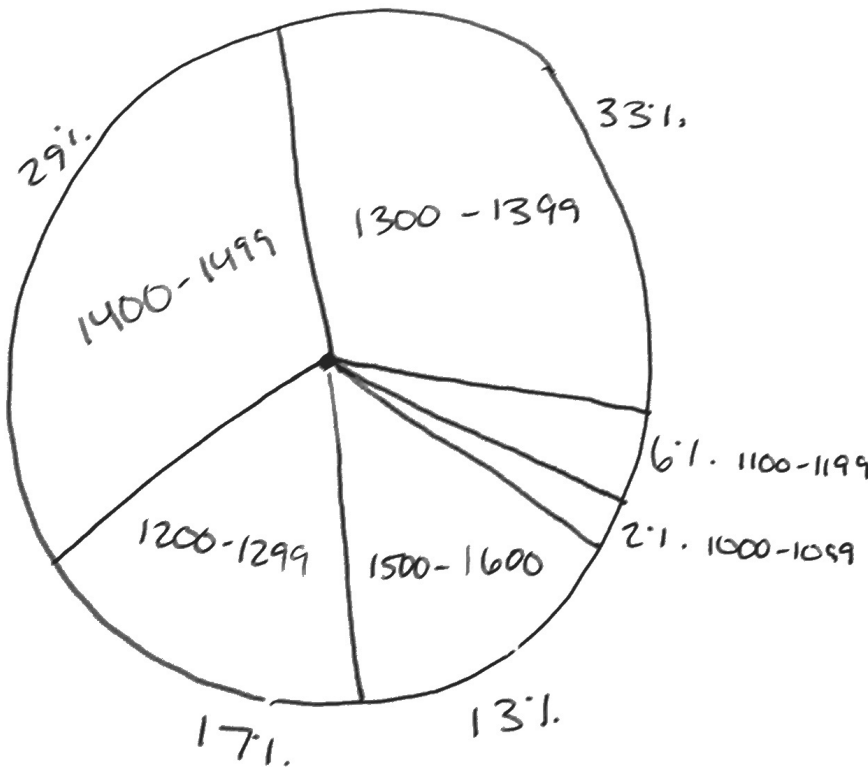
Reason:

- categorical data

Note:
Pie chart works great too!

2. Combined SAT scores are as follows. If using a pie chart, convert to degrees.

| | | |
|------------|-----|--------|
| 1500-1600 | 13% | 46.8° |
| 1400-1499 | 29% | 104.4° |
| 1300-1399 | 33% | 118.8° |
| 1200-1299 | 17% | 61.2° |
| 1100-1199 | 6% | 21.6° |
| 1000-1099 | 2% | 7.2° |
| below 1000 | 0% | 0° |



Reason:

- % add up to 100
- categorical

Note:
Histogram works great too!

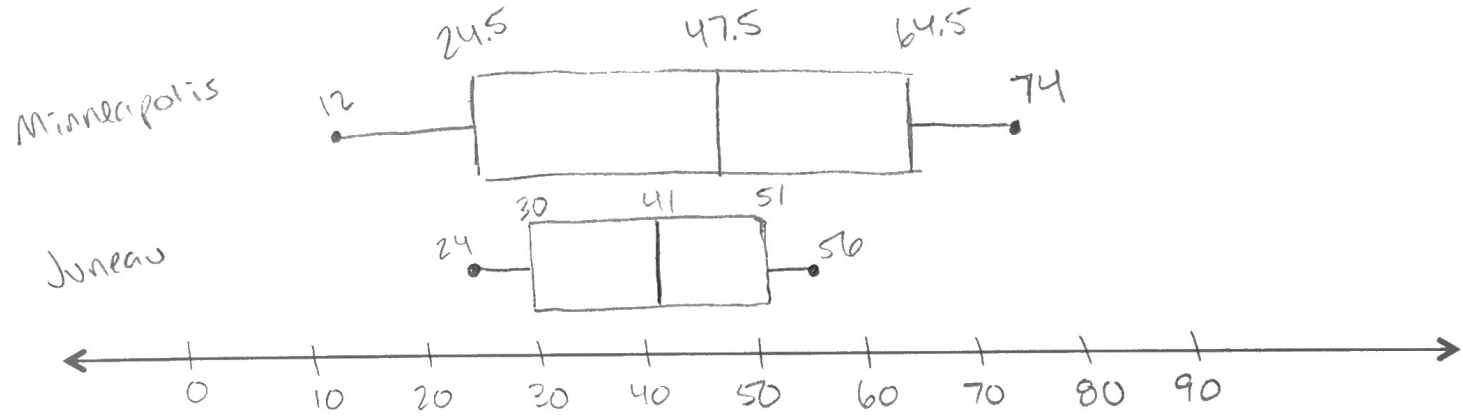
3-7, use the data on normal daily mean temperatures by month in Juneau, Alaska and Minneapolis-St. Paul, Minnesota. Data is rounded to nearest degree Fahrenheit.

$IQR = 21$
 $1.5 \cdot IQR = 31.5$
 $Q_1 - 60 = 30$
 $Q_3 + 60 = 82.5$
 24
 27
 28
 30
 32
 33
 41
 41
 42
 47
 49
 51
 53
 56

| Month | Juneau, AK | Minneapolis-St. Paul, MN |
|-------|------------|--------------------------|
| Jan | 24 | 12 |
| Feb | 28 | 18 |
| Mar | 33 | 31 |
| Apr | 40 | 46 |
| May | 47 | 59 |
| June | 53 | 68 |
| July | 56 | 74 |
| Aug | 55 | 71 |
| Sept | 49 | 61 |
| Oct | 42 | 49 |
| Nov | 32 | 33 |
| Dec | 27 | 18 |

$IQR = 40$
 $1.5 \cdot IQR = 60$
 $Q_1 - 60 = 12$
 $Q_3 + 60 = 124.5$
 12
 18
 18
 31
 33
 46
 47.5
 49
 59
 61
 64.5
 68
 71
 74

3. Draw 2 boxplots using the same number line to illustrate the data and to justify answers to the remaining questions.



4. Which city has higher summer temperatures? Justify using boxplot.

Minneapolis \rightarrow Q_3 and max is higher

5. Which has lower winter temperatures? Justify using boxplot.

Minneapolis \rightarrow Q_1 and min is lower

6. On average, which city has higher average temperature? Use a measure of center to justify your answer.

Minneapolis \rightarrow median is higher

7. On average, which city shows greater variability in temperature? Justify using boxplot.

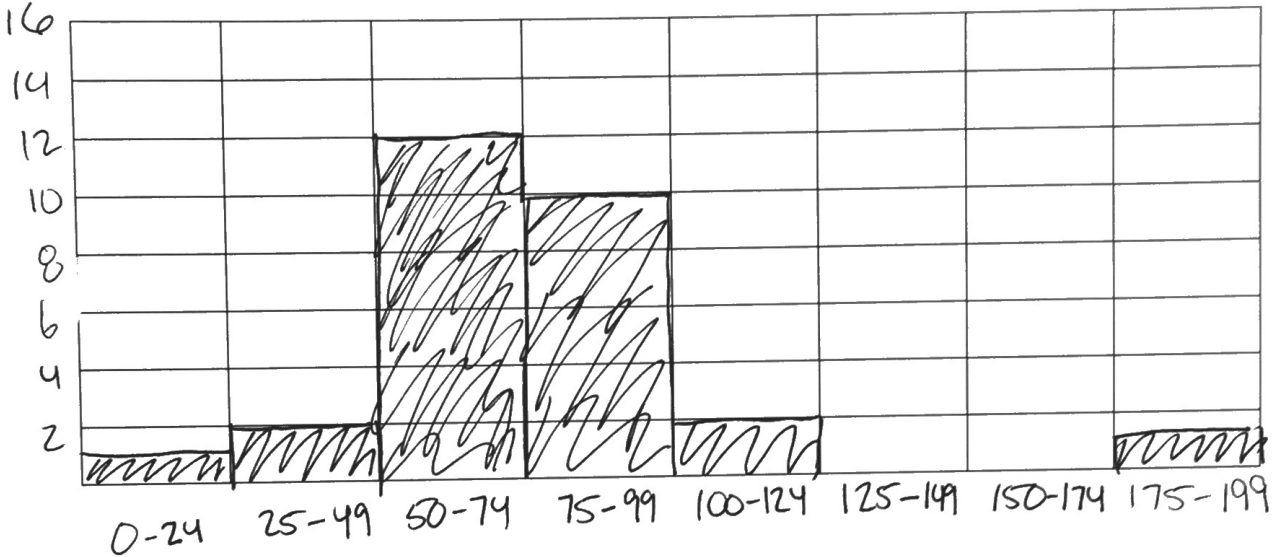
Minneapolis \rightarrow wider range

10) The number of boxes of cookies sold by each member of a Girl Scout troop is given.

11, 40, 48, 62, 62, 67, 68
 69, 70, 71, 71, 73, 73, 74, 74
 77, 77, 77, 80, 82, 87, 88
 92, 93, 94, 102, 103, 176

| | | | | | | |
|---------------|---------------|---------------|---------------|----------------|----------------|----------------|
| 73 | 82 | 94 | 92 | 102 | 62 | 68 |
| 71 | 73 | 74 | 69 | 11 | 88 | 80 |
| 40 | 74 | 48 | 71 | 77 | 70 | 93 |
| 87 | 67 | 77 | 77 | 62 | 103 | 176 |

8. Display this data in a histogram.



9. Find mean, median and mode for this data.

\downarrow \downarrow \downarrow
 77.2 74 77
 $\frac{2161}{28}$

min = 11
 $Q_1 = 68.5$
 med = 74
 $Q_3 = 87.5$
 max = 176

10. Use 1.5xIQR criterion to determine any outliers.

$IQR = 87.5 - 68.5 = 19$
 $87.5 + 1.5(19) = 116 \uparrow$
 $68.5 - 1.5(19) = 40 \downarrow$
 Outliers: 11, 176

11. A bowler has scores of 132, 181, 150, 97 and 165. What score would a bowler need in the next game to bring their average up to 150?

$$\frac{132 + 181 + 150 + 97 + 165 + x}{6} = 150$$

$$725 + x = 900 \quad \boxed{x = 175}$$

12. In one Algebra II class with 20 students, the average grade on an exam was 83; in another class with 25 students, the mean grade was 73. What is the combined mean of the two classes?

$$\frac{83(20) + 73(25)}{45} = \boxed{77.44 \cdot 1}$$

3 - 18) A back-to-back stem and leaf plot gives scores of male and female students on a test.

13. How many students took the test?

40

14. State the minimum.

70

15. State the maximum.

200

16. Calculate the range.

$$200 - 70 = \boxed{130}$$

17. State the mode.

109

18. Give 5-number summary and use $1.5 \times IQR$ test for outliers.

min: 70
 Q_1 : 109
 med: 127.5
 Q_3 : 143.5
 max: 200

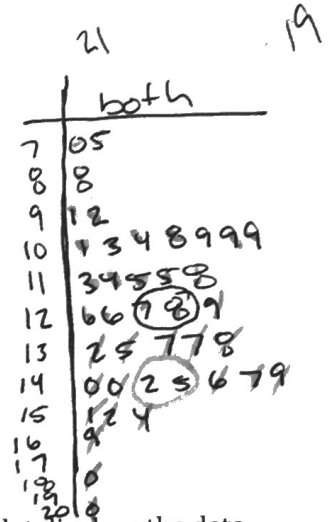
$$IQR = 143.5 - 109 = \boxed{34.5}$$

$$143.5 + 34.5(1.5) = 195.25 \uparrow$$

$$109 - 34.5(1.5) = 57.25 \downarrow$$

outlier: 200

| male | | | female | | |
|------|---|---|--------|---|-------|
| 5 | 0 | 7 | | | |
| | 8 | 8 | | | |
| | 2 | 1 | 9 | | |
| 9 | 8 | 4 | 10 | 1 | 3 9 9 |
| 5 | 4 | 3 | 11 | 5 | 8 |
| | 8 | 6 | 12 | 6 | 7 9 |
| | 5 | 2 | 13 | 7 | 7 8 |
| 7 | 6 | 0 | 14 | 0 | 2 5 9 |
| | | 1 | 15 | 2 | 4 |
| | | 9 | 16 | | |
| | | | 17 | | |
| | | 0 | 18 | | |
| | | | 19 | | |
| | | | 20 | 0 | |

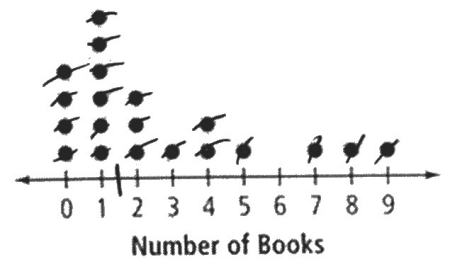


(19-21) A teacher asked 20 students how many books they read last summer. The dot plot displays the data.

19. How many students read 4 books?

2

Books Read Last Summer



20. Find each measure.

a. mode

1

b. median

1.5

c. range

$$9 - 0 = \boxed{9}$$

21. What percent of the students read five or more books?

~~4/20~~ $\frac{4}{20} = \boxed{20\%}$

22-23) Find the minimum, Quartile 1, Median, Quartile 3, and Maximum of each data set.

22. 34, 45, 32, 36, 44, 45, 48, 35, 36

32, 34, 35, 36, 36, 44, 45, 45, 48

min: 32

Q_1 : 34.5

med: 36

Q_3 : 45

max: 48

23. 2, 5, 6, 7, 2, 3, 3, 1, 1, 1

1, 1, 2, 2 | 3, 3, 3, 6, 7

min: 1

Q_1 : 1

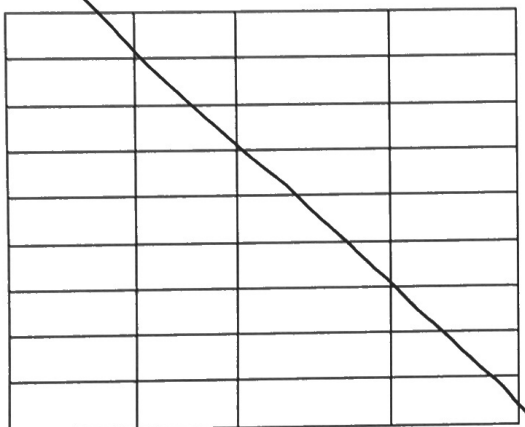
med: 2.5

Q_3 : 5

max: 7

24) Find the standard deviation by hand. Then, verify with your graphing calculator.

26, 25, 26, 25, 27, 21, 22, 25



just use calculator

Standard Deviation = 1.93

(25-28) A normal distribution has a mean \bar{x} , and standard deviation, σ . For a randomly selected x-value from the distribution, find: (Hint: Use the empirical rule)

25. $P(\bar{x} - \sigma \leq x \leq \bar{x})$

34.1%

26. $P(\bar{x} - \sigma \leq x \leq \bar{x} + 3\sigma)$

83.85%

27. $P(\bar{x} - 2\sigma \leq x \leq \bar{x} + 3\sigma)$

97.35%

28. $P(\bar{x} - 3\sigma \leq x \leq \bar{x} + 2\sigma)$

97.35%

9-32) Use the Standard Normal Table to find the following probabilities.

29. $P(x \leq 1.2)$

$.8849$

30. $P(x > 2.3)$

$1 - .9893$
 $.0107$

31. $P(x > 1.2)$

$1 - .8849$
 $.1151$

32. $P(x \leq -2.0)$

$.0228$

(33-36) Use the Standard Normal Table to find the following z-scores:

33. .9995

3.3

34. .1357

-1.1

35. .6915

0.5

36. .9192

1.4

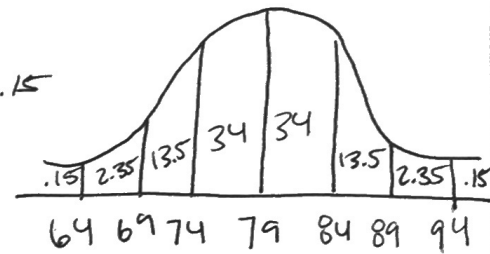
(37-40) The scores on a test in a math class is a normal distribution and has a mean of 79 and a standard deviation of 5. Find the probability that a randomly selected x-value from the distribution is in the given interval. (Hint: draw a picture)

37. Between 74 and 89

$34 + 34 + 13.5$
 $81.5 - 1$

38. More than 74

$34 + 34 + 13.5 + 2.35 + .15$
 84.1



39. $P(x \leq 85)$

$z = \frac{85 - 79}{5}$
 $z = 1.2$

$.8849$

40. $P(70 < x \leq 90)$

$z = \frac{70 - 79}{5}$
 $z = -1.8$
 $.0359$

$z = \frac{90 - 79}{5}$
 $z = 2.2$
 $.9861$

$.9861 - .0359 = .9502$

41. A study found that the temperature of a ceramic furnace is normally distributed with mean temperature of 1426 degrees Fahrenheit and standard deviation of 42 degrees. What is the probability that a randomly selected furnace will have a temperature less than or equal to 1500 degrees Fahrenheit?

$z = \frac{1500 - 1426}{42}$

$z = 1.8$

$P(x \leq 1.8) = .9641$

42. Sketch each of the 3 distributions as left skewed, right skewed and normal. Label the approximate median and mean on each distribution.

