## A. Review – Statistics Terminology

| Terms | Definition |
|---|---|
| Population | |
| Sample | |
| Random Sample | |
| Discrete data | |
| Continuous data | |
| Univariate Stats | |

Our initial look into univariate stats will focus on three items ➔ the center, the spread & the shape of a data set

| "center" | Definition |
|---|---|
| Mean | |
| Median | |
| Mode | |

| "spread" | Definition |
|---|---|
| Range | |
| Quartiles | |
| IQR | |
| Outlier | |

| "shape" | Definition |
|---|---|
| Normal | |
| Positively Skewed | |
| Negatively Skewed | |

## B. Review Problems

1. Determine the mean and median of the following data sets:

(a) Set of Raw Data for Leila's discus throws in training

22.45 m, 23.47 m, 19.58 m, 21.40 m, 22.49 m, 21.75 m, 27.03 m, 26.00 m, 24. 73 m, 24.00 m

(b) Frequency Table for Mostafa's Homework Grades this year

| Score on 5 | Frequency |
|---|---|
| 0 | 6 |
| 1 | 2 |
| 2 | 1 |
| 3 | 7 |
| 4 | 2 |
| 5 | 4 |

(c) Grouped Data Set for Kholood's 200m sprint training times

| Time Intervals | Frequency |
|---|---|
| $28 \leq t < 30$ | 2 |
| $30 \leq t < 32$ | 5 |
| $32 \leq t < 34$ | 4 |
| $34 \leq t < 36$ | 8 |
| $36 \leq t < 38$ | 9 |
| $38 \leq t < 40$ | 2 |

2. Here are Joud's results from last 5 tests in Math class: 76%, 65%, 82%, 91%, and 80%.

   a. Joud has one more test to write and she would like to have a test average of 80% over her 6 tests. What should her test score be on her $6^{th}$ test in order to get her test average to be 80%?

   b. From her 6 class tests, what is the maximum test average she could get?

3. Draw 2 box plots on the same diagram, using the information on the length of time for 2 different types of light bulbs.

| Speedy Light: | Ultrabulb: |
|---|---|
| Lowest Value – 1200 hours | Lowest Value – 1050 hours |
| Lower Quartile – 1500 hours | Median – 1400 hours |
| Median – 1700 hours | Upper Quartile – 1900 hours |
| Upper Quartile – 1800 hours | Range – 1100 hours |
| Range – 1600 hours | Interquartile range – 750 hours |

   a) Look at the medians and interquartile ranges as illustrated in your B/W plot. Use these to compare the different types of bulb. Which would you be most likely to use and why?

   b) What is the probability of a random Speedy Light bulb lasting more than 1800 hours?

4. Aly is preparing for the math Semester Exam and is worried about his math grade. His current grade in Math is 76.3% and he would like to get a B- in Math this year, so he wants at least an 80% average in Math this year. If the score on the Final Exam is weighted as 20% of the final course grade, what does Aly need to score on his Final Exam to finish with an 80% as his course grade?

5. A random sample of 167 people who own mobile phones was used to collect data on the amount of time they spent per day using their phones. The results are displayed in the table below.

| Time spent per day ($t$ minutes) | $0 \leq t < 15$ | $15 \leq t < 30$ | $30 \leq t < 45$ | $45 \leq t < 60$ | $60 \leq t < 75$ | $75 \leq t < 90$ |
|---|---|---|---|---|---|---|
| Number of people | 21 | 32 | 35 | 41 | 27 | 11 |

(a) State the modal group.

(b) Calculate approximate value of the mean of the time spent per day on these mobile phones.

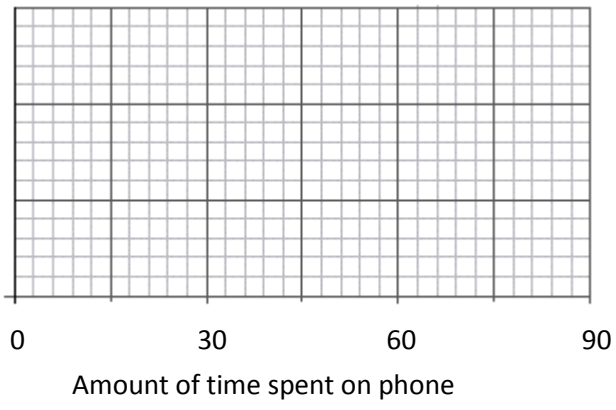
(c) On graph paper, draw a fully labeled histogram to represent the data.

(d) On graph paper, draw a fully labeled cumulative frequency graph to represent the data.

(e) Using your cumulative frequency graph, determine the median of the amount of time they spent per day using their phones.

(f) Using your cumulative frequency graph, calculate the interquartile range of the amount of time they spent per day using their phones.

(g) Draw the box and whisker plot on the grid below that shows the distribution of the amount of time they spent per day using their phones.



6. The amount of money spent by men and women at a shopping centre is shown in the tables below.

| Money spent, m (£) | Frequency | |
|---|---|---|
| $0 < m \leq 25$ | 5 | |
| $25 < m \leq 50$ | 18 | |
| $50 < m \leq 75$ | 17 | |
| $75 < m \leq 100$ | 11 | |
| $100 < m \leq 125$ | 9 | |

MEN:

| Money spent, m (£) | Frequency | |
|---|---|---|
| $0 < m \leq 25$ | 2 | |
| $25 < m \leq 50$ | 13 | |
| $50 < m \leq 75$ | 14 | |
| $75 < m \leq 100$ | 19 | |
| $100 < m \leq 125$ | 12 | |

WOMEN:

a) Calculate the cumulative frequencies

b) Draw properly labelled cumulative frequency curves for the men and women on the same axes.

c) Use your curve to estimate the median, quartiles and IQR for the men and women.

d) Draw 2 box & whisker plots (one for men and one for women) on the same axes.

e) Make 4 observations/comparisons about the amount of money spent by the men and women at the shopping centre.

f) Estimate the number of men and women who spent **over** £80.

7. The table below shows the frequency distribution of the number of dental fillings for a group of 250 American children.

| Number of fillings | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Frequency | 40 | 30 | 50 | $q$ | 40 | 10 |

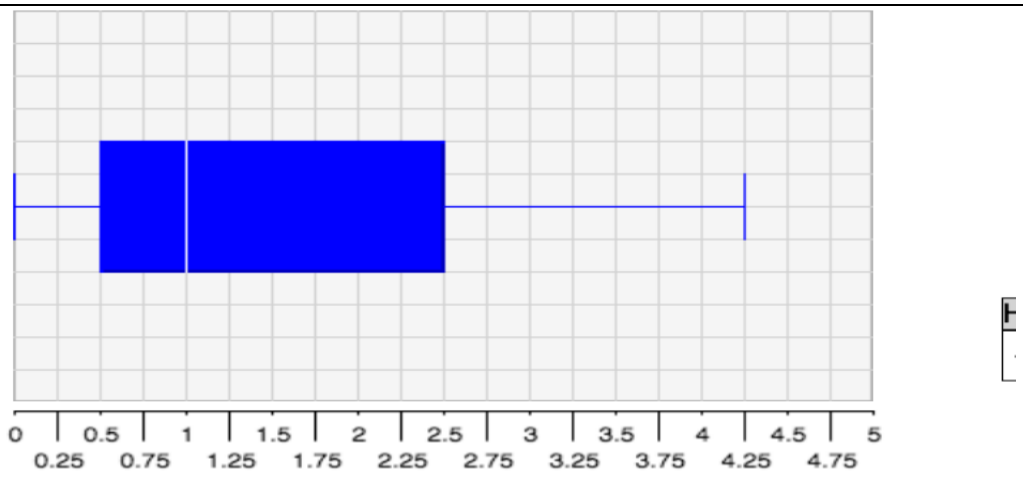
a. Show that the value of $q$ is 80.

b. Is this data an example of discrete data or continuous data? Explain your reasoning.

c. Use your calculator to find:

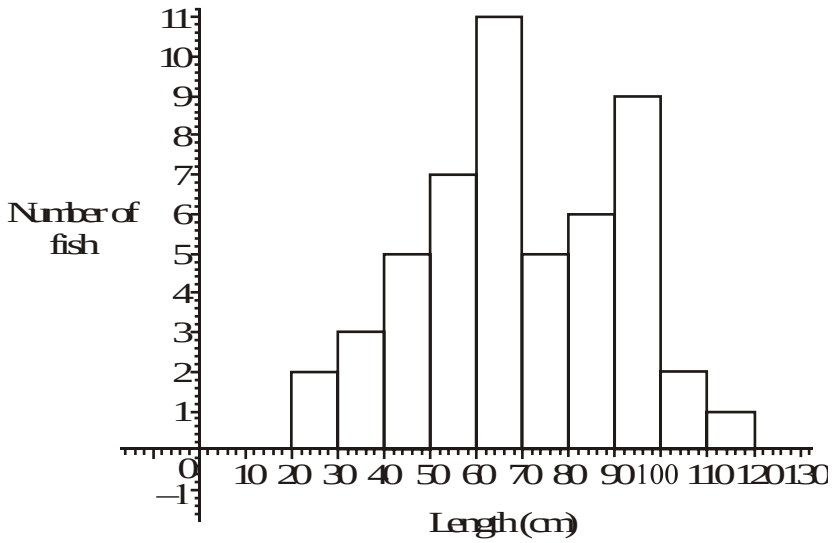
(i) the mean number of fillings (ii) the median number of fillings (iii) the mode number of fillings

d. The following box and whisker plot showing statistical information about the number of dental fillings for a group of ***250 Egyptian children***.




| List one thought/observation about the number of fillings in American and another one for the Egyptian children | List one question you may have about the data presented | Which group (American or Egyptian) seems to have more fillings? Explain your reasoning |
|---|---|---|
| | | |

8. The figure below shows the lengths in centimeters of fish found in the net of a small trawler.




a. Find the total number of fish in the net.

b. Find

i. the modal length interval;

ii. the interval containing the median length;

iii. an estimate of the mean length.

The fishing company must pay a fine if more than 10% of the catch have lengths less than 40cm.

c. Will the company be fined? Show your calculations to back up your answer.

9. Kelly scored the following on 5 science tests during second semester: 73%, 89%, 94%, 87%, 82%.

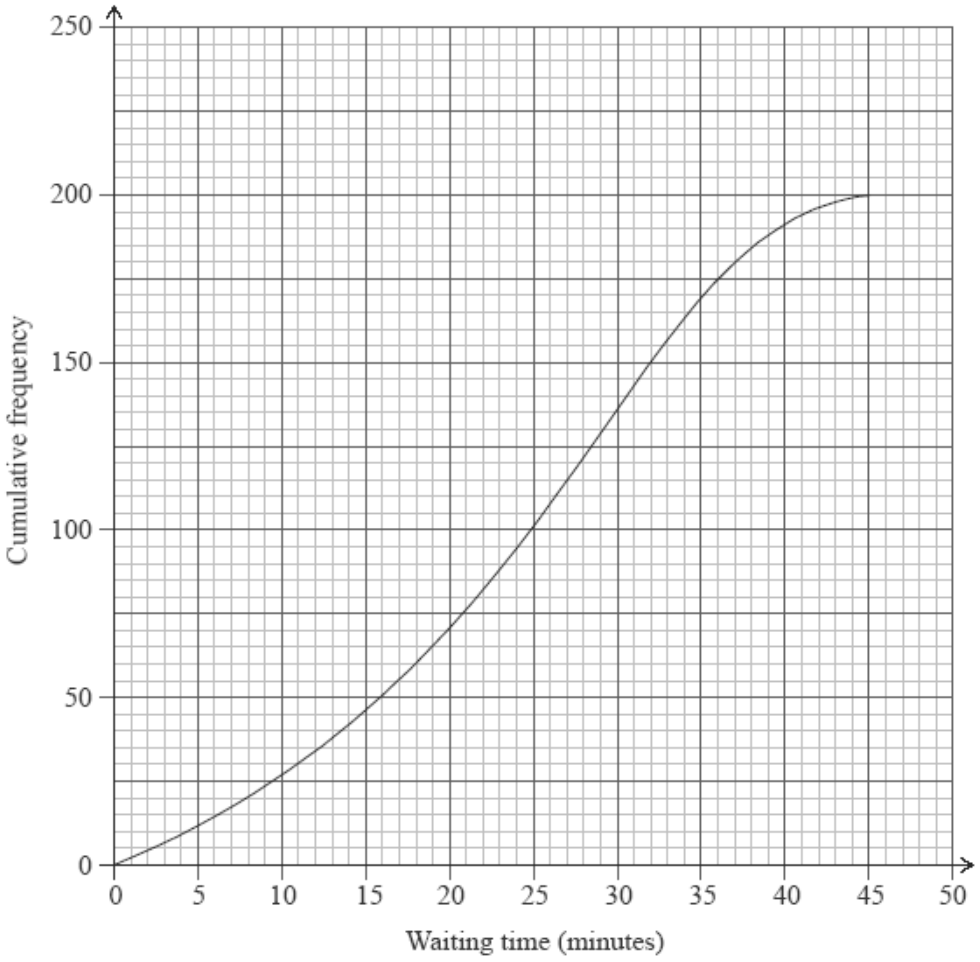
a. What is the next test score Kelly must get to have an 85% test average in science?

b. What is Kelly's maximum possible test average in science?

Let's say Kelly scored 95% on Test #6. Now Kelly's semester grade is 86.7%. In Science, the final exam is weighted 20% of the overall grade and the semester grades are weighted 80% of the overall grade. Kelly's personal goal for second semester is to earn **at least** a B+ in Science.

c. Is it possible for Kelly to get an A- (90%) in Science?

10. The cumulative frequency graph shows the amount of time in minutes, 200 students spend waiting for their train on a particular morning.




Use the graph to:

a. Write down the median waiting time.

b. Write down an estimate for Q1 and for Q3.

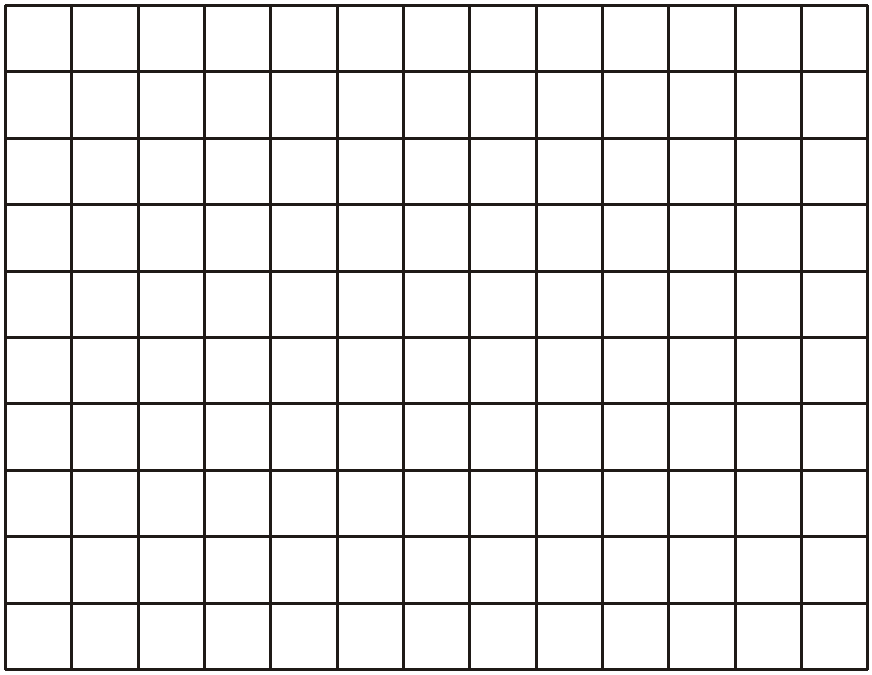
c. Find the percentage of students who waited for more than 37 minutes.

d. Find the value of $m$ if 57.5% of the time students waited for less than $m$ minutes.

11. A random sample of 167 people who own mobile phones was used to collect data on the amount of time they spent per day using their phones. The results are displayed in the table below.

| Time spent per day ($t$ minutes) | $0 \le t < 15$ | $15 \le t < 30$ | $30 \le t < 45$ | $45 \le t < 60$ | $60 \le t < 75$ | $75 \le t < 90$ |
|---|---|---|---|---|---|---|
| Number of people | 21 | 32 | 35 | 41 | 27 | 11 |

a. Draw a fully labeled histogram to represent the data.



b. State the modal group.

c. Use your calculator to calculate approximate values of the mean and median of the time spent per day on these mobile phones.

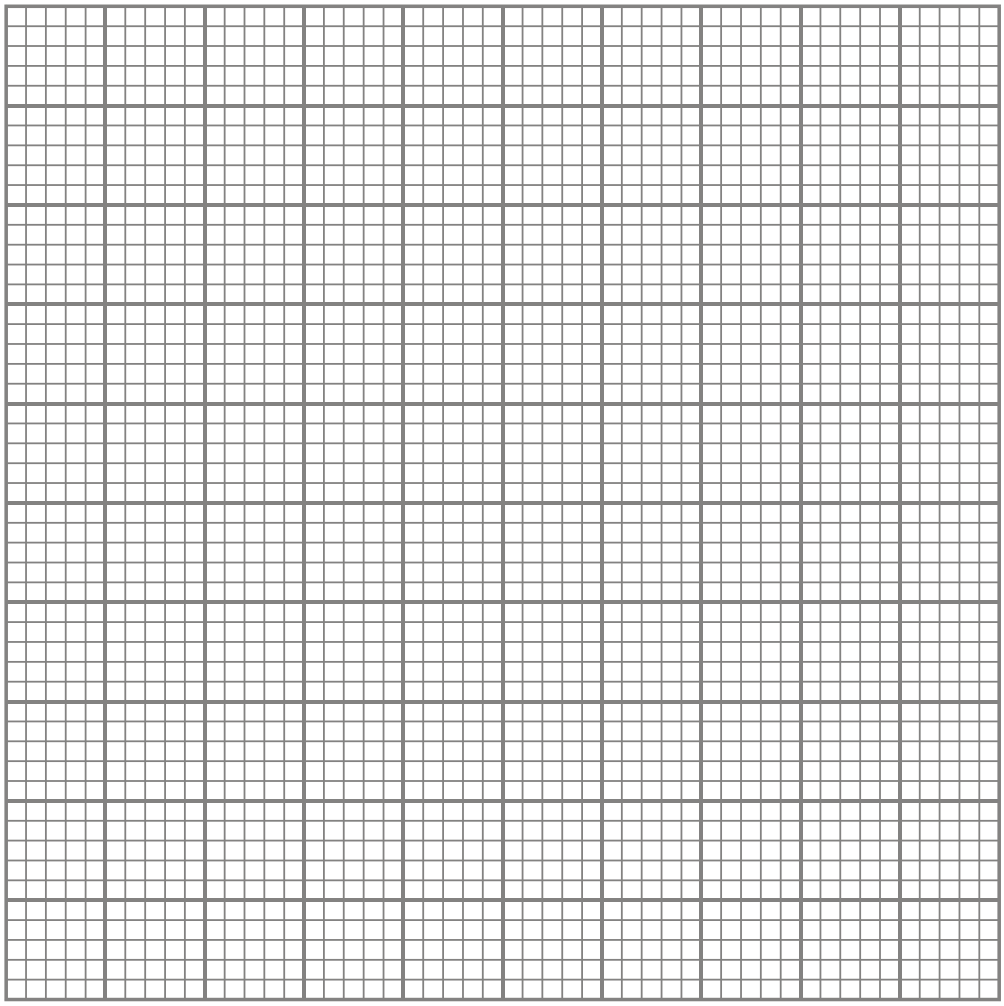
d. If there are 250,783 people in the town where the sample was taken, approximately how many people in this town spend at least 45 minutes on their mobile phones?

12. The local council has been monitoring the number of cars parked near a supermarket on an hourly basis. The results are displayed below.

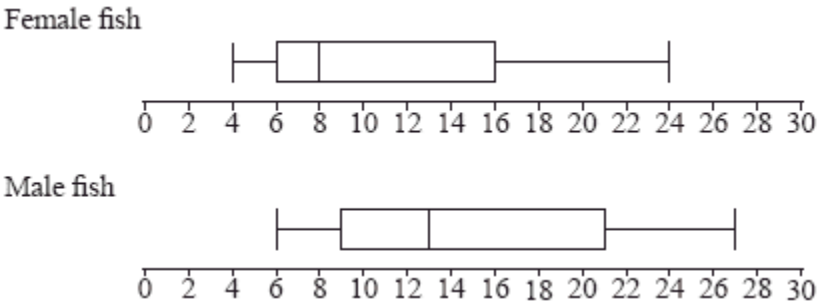
| Parked Cars/Hour | Frequency | Cumulative Frequency |
|---|---|---|
| 0–19 | 3 | 3 |
| 20–39 | 15 | 18 |
| 40–59 | 25 | *w* |
| 60–79 | 35 | 78 |
| 80–99 | 17 | 95 |

a. Write down the value of *w*.

b. Draw and label the **Cumulative Frequency** graph for this data.



13. A scientist has 100 female fish and 100 male fish. She measures their lengths to the nearest cm. These are shown in the following box and whisker diagrams.




a. Write down the median length of the female fish.

b. Write down the median length of the male fish.

c. Find the interquartile range of the female fish.

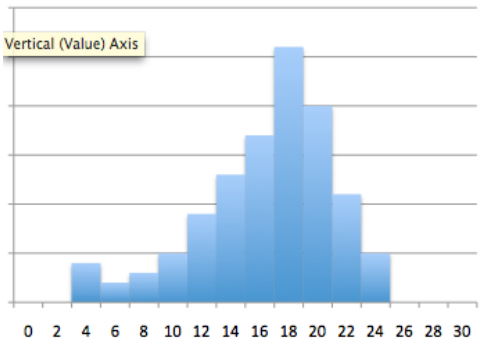
d. Find the interquartile range of the male fish.

e. Make a conclusion about the lengths of female and male fish.

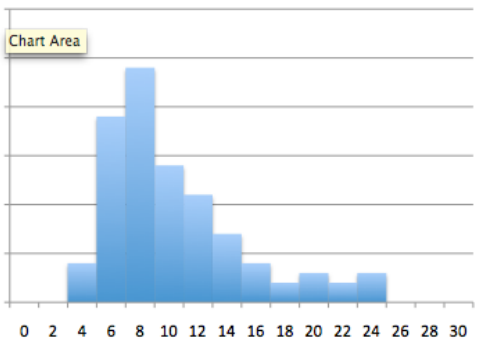
f. Find the range of the lengths of all 200 fish.

g. Here are three plots that COULD represent the box & whisker pots for the **female fish**. Select one and explain your reasoning.

PLOT (A)




PLOT (B)




PLOT (C)