Mathematics Essentials 2015
Unit 2: Test 1
Task Weighting: 13%

Student Name: *SOLUTIONS*

Time Allowed: 45 Minutes   Total Marks: 45

Calculators and files are allowed in this test.
Answer all of the following questions. Show all working to maximise marks.

Question 1 [5 Marks: 1, 1, 1, 1, 1]

From the lists of data displays and data types below, complete the table by choosing the most appropriate Data Display and Data Type.

Data Displays
- Column graph
- Dot frequency diagram
- Back to back stem and leaf diagram
- Histogram
- Pie

Data Types
- Numerical
- Categorical

|	Data Display	Data Type
The heights (measured in cm) of 20 boys and 20 girls to compare them.	Back to Back S/Leaf (2) Histograms	Numerical
The eye colour of all Year 11 students.	Dot frequency Column/ Pie	Categorical
The foot length, measured in cm, of the members of your class	Histogram	Numerical
The percentage of students in each year at our school.	Column, Pie	Categorical
The birth month of all Essentials students.	Column, Pie Dot Freq.	Categorical

½ each box

Question 2   [6 marks: 1, 1, 1, 2, 1]

This dot plot shows the number of motor vehicle thefts in the Goldfields region of Western Australia recorded each month for one year.

Number of vehicles stolen
per month in the Goldfields

```
                    •
•        •    •     •         •
•   •    •    •     •         •     •
9   10   11   12    13   14   15   16
```
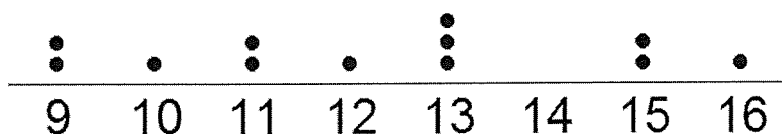
a)   Calculate the range of the scores, showing your working.

$$16 - 9 \tfrac{1}{2} = 7 \tfrac{1}{2}$$

b)   Determine the mode.   13   ✓

c)   Determine the median.   12·5   ✓

d)   Calculate the mean, showing your working.

$$147 \div 12 = 12·25 \quad ✓✓$$

e)   Complete this sentence:
      For the Goldfields region, you would expect approximately ____13____ vehicles stolen within a month.   ✓

Question 3   [4 marks: 2, 2]

Two classes are marked on the same tests.

- Class P has a mean of 65% and standard deviation of 5.
- Class Q has a mean of 50% and standard deviation of 15.

a) Write a statement comparing the scores of the two classes, who had the better scores and why?

✓ Class P as most students were scoring around 65%. Results grouped around 65%   ✓

b) Write a statement comparing the spread of the scores for the two classes and why.

Class Q has a greater spread as SD is higher   ✓

Question 4 [17 marks: 2, 2, 3, 6, 4]

Consider the data to the right, showing the heights of 20 male and 20 female Year 7 students, taken from CensusAtSchool.

a) Circle or highlight any outliers in the data.
   i. For any you find, explain why you consider it an outlier.

   106 is much smaller than the rest of the heights. ✓

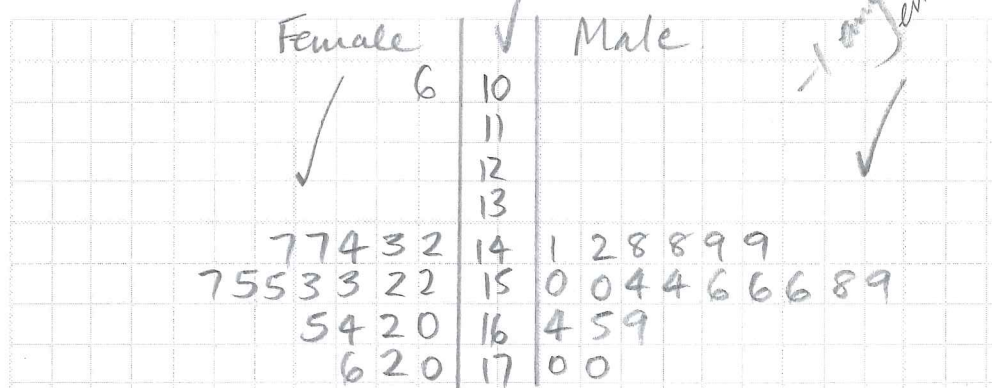b) Explain the effect the outlier(s) have on the:
   i. Mean

   The outlier decreases the mean. ✓

   ii. Median

   No effect. ✓

c) Make a back-to-back stem and leaf diagram to display this data. ✓

Female		Male
6	10	
	11	
	12	
	13	
7 7 4 3 2	14	1 2 8 8 9 9
7 5 5 3 3 2 2	15	0 0 4 4 6 6 6 8 9
5 4 2 0	16	4 5 9
6 2 0	17	0 0

↗ any error ✓

d) Complete the table below, showing your working, to summarize the statistics for this data.

Statistic	Female	Male
Mode	no mode ✓	156 ✓
Median	154 ✓	155 ✓
Range	70 ✓	29 ✓

e) Using your stem and leaf plot and/or the table in d), compare the data for males and females.
   i. List two ways are the two groups similar? ✓

   Same no. of students ✓
   Both grouped 140's – 170's ✓
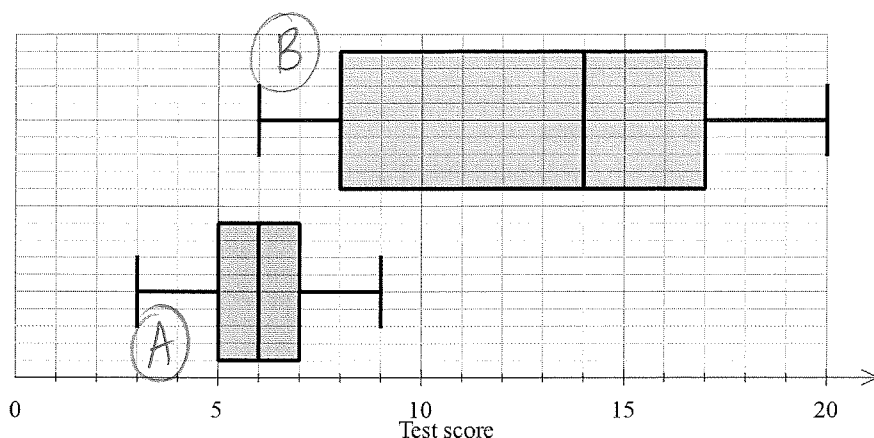
   ii. List two ways are the two groups different? ✓

   Outlier in Females ✓
   Range is very different ✓

any reasonable statement.

$\bar{x} = 153.75$ girls
$\bar{x} = 155.4$ boys

Height (cm)
Year 7 students

Female	Male
106	141
142	142
143	148
144	148
147	149
147	149
152	150
152	150
153	154
153	154
155	156
155	156
157	156
160	158
162	159
164	164
165	165
170	169
172	170
176	170

Question 5 [13 marks: 1, 5, 4, 3]

Test scores for Class A and Class B

a) Eric is in Class A, he scored 5 on the test. **Label the two box plots** with their class names. ✓

b) Use the table below to enter the appropriate values for each of the plots.

Statistic	Class A	Class B
Minimum	3	6 ✓
First quartile	5	8 ✓
Median	6	14 ✓
Third quartile	7	17 ✓
Maximum	9	20 ✓

½ each

c) Calculate the range and interquartile range for each class, showing the working, in the table below.

Statistic	Class A	Class B
Range	6 ✓	14 ✓
Interquartile range	2 ✓	9 ✓

d) In each of the statements below, write A and B as appropriate to make the statement true.

- Class __B__ has a much greater range than Class __A__   ✓

- The minimum for Class __B__ is the same as the median for Class __A__ ✓

- For Class __A__, the data is symmetrical and for Class __B__, 100% of the scores are greater than 6. ✓

6 or greater.

END OF TEST