

Year 11 Maths A Revision Sheet

End semester 2, 2009

Chapter 10 Page 382 to 450 Chapter 11 Page 451 to 486

Exam Date 19th November - Exam duration will be 2 hours

REMEMBER it is necessary to review all of the work done this term. The revision sheet is a guide only.

- 1) This stem and leaf plot shows the heights of a group of students .

Height of Students (cm)	
Girls	Boys
2 1 13	1 3
8 7 7 6 14	2 2 3
7 3 2 1 1 15	1 3 7 7
5 2 0 0 16	0 0 1 3 3 3 7 8
2 1 1 17	2 2 3 4 5

- a) How many were surveyed?
b) What is the mean height of : i) the girls and ii) the boys?
c) What is the mean height of the whole group?
d) How many boy's heights are above the whole group mean?
e) What is the median height of: i) the girls and ii) the boys?
f) What is the median height of the whole group?
g) What is the mode of the whole group?
- 2) Twenty students sat for a test and the mean was 65%. An extra student sat for the test and scored 75%. What was the new mean correct to 1 decimal place?
- 4) (MP) The mean for a Maths test for 30 students was 68%. Troy discovered his mark of 81% had been recorded as 18%. What should the correct mean have been?
- 5) What is the **class mean** for a test in which 14 boys had a mean mark of 55 and 11 girls had a mean mark of 65?

6)

A population consists of the marks for the Maths A projects of the 94 Maths A students in Year 12. Several samples of size 8 are taken. Find the mean and standard deviation of each sample.

Sample A	17	15	13	16	11	18	14	19
Sample B	19	9	15	14	14	17	15	18
Sample C	13	17	6	17	14	16	12	16
Sample D	9	14	18	19	11	10	13	15

7) (MP)

Score (x)	Frequency (f)
x	12
y	8

- a) Find the value of $x + y$, given that the mean is 7.6 and the mode is 8.
 b) What is the value of y if the median is 5 and the mean is 6?

8) Construct a box and whisker plot for the following:

Lowest score = 25 Highest score = 60 Lower quartile (Q_1) = 35
 Upper quartile (Q_3) = 42 and Median (Q_2) = 40.

9) Find the range, mean, median, mode and interquartile range of the set of scores below.

20 16 13 14 15 19 16
 18 18 17 16 13 17 19
 20 20 16 13 15 14 17

10) The stem and leaf plot shows the number of telephone calls made by a group of students

Number of telephone calls

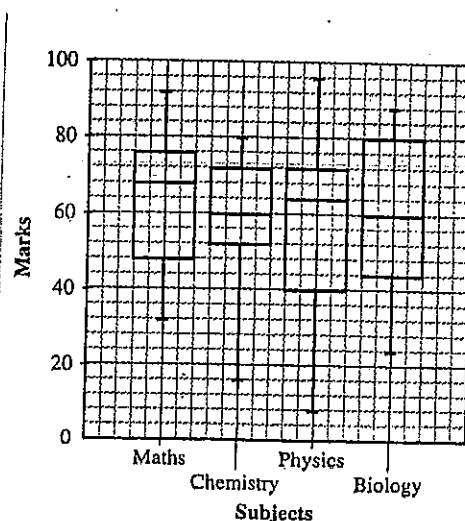
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1 | 0
2 | 0 1 1 3 7 9
3 | 6 6 7 8 9
4 | 0 1 2 2 3 5 5 7
5 | 2 7
6 | 1
    
```

- a) Find the median, Q_1 and Q_3
 b) Draw a box and whisker plot of the data.

11) These box and whisker plots show the exam results in four subjects of Year 11 students.

(See questions on the following page).



Which subject has

- a) the highest range?
- b) the highest median?
- c) an upper quartile of 80?
- d) a lower quartile of 52?
- e) an interquartile range of 20
- f) the highest mark.

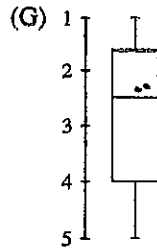
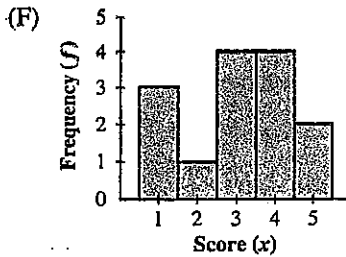
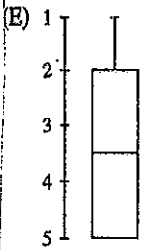
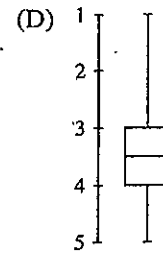
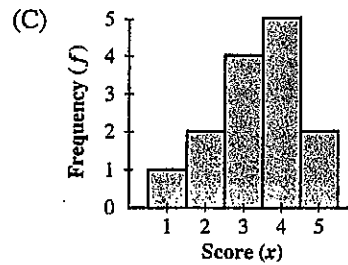
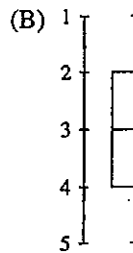
h) What is the percentage of students scoring between 48 and 76 in Maths?

i) **(MP)** Assuming that the same students did all four tests, in which subject has the class obtained the best results? Explain your answer.

12) There are three sets of matching data below. (Two diagrams are not related) Pick the frequency table, histogram and box and whisker plot which go together. There are 3 answers.

(A)

x	f
1	1
2	2
3	4
4	5
5	2

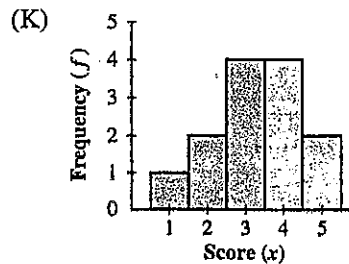
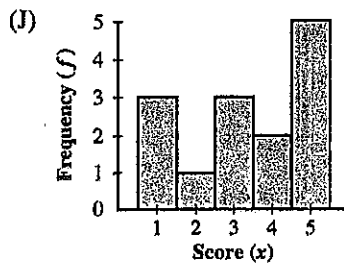


(H)

x	f
1	3
2	1
3	4
4	4
5	2

(I)

x	f
1	3
2	1
3	3
4	2
5	5



13) Find the mean, median and mode for the following sets of data.:

a) 7, 15, 8, 8, 20, 14, 8, 10, 12, 6, 19

b) Stem Leaf

```

1 | 2 6
2 | 1 7 8
3 | 0 3 3 4 6 8
4 | 0 1 1 5 9
5 | 1 3 6
    
```

c)

Score (x)	Frequency (f)
70	2
71	6
72	9
73	7
74	4

14) The data below show the number of students attending weekly lectures in Applied Mathematics over the previous year.

76, 43, 29, 58, 82, 63, 36, 45, 70, 68, 34, 89, 95, 66, 41
 37, 86, 53, 72, 92, 91, 87, 61, 37, 48, 64, 81, 42, 59, 77

Place the above in a frequency table with class intervals of 10.

15) The data below show the daily sales of calculators in a large electronics store over the last three weeks of January. Represent the data in a back to back stem and leaf plot.

(GC = graphics calculator; SC = scientific calculator)

GC	2	3	6	9	12	10	24	17	15	19	20	26	24	18	29	33	30	36
SC	7	6	10	8	15	11	20	18	23	28	30	26	32	38	39	35	43	41

16) Use your calculator in statistics mode to calculate the mean and standard deviation of the following giving answers to the second decimal place where necessary.

a) 12, 13, 15, 19, 21, 30, 15, 19, 26, 13, 41, 16, 17, 12

b)

Score (x)	Frequency (f)
2	2
3	5
4	7
5	3
6	8
7	2

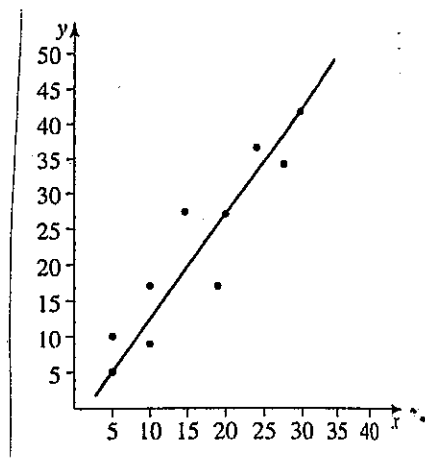
17) A sample of 30 people was selected at random from those attending a local swimming pool. The ages were as follows: 19, 7, 58, 41, 17, 23, 62, 55, 40, 37, 32, 29, 21, 18, 16, 10, 40, 36, 33, 59, 65, 68, 15, 9, 20, 29, 38, 24, 10, 30.

- Find the mean and the median age of the people in the sample.
- Complete a frequency table with class intervals of 5.
- Calculate the cumulative frequency.
- What is the modal class?
- What is the median class?
- Calculate the standard deviation.

18) For the following decide which of the variables is independent and which is dependant.

- Number of hours spent studying for a Maths exam and the result obtained.
- The heart rate of a runner and the running speed.

19)



- Use the line of best fit to predict the value of y when the value of x is:
 - 10
 - 35
- Use the line of best fit to predict the value of x when the value of y is:
 - 15
 - 30

20) For his birthday, Ari was given a small white rabbit. To monitor the rabbit's development, Ari decided to measure it once a week. The table shows the length of the rabbit for 20 weeks.

Week Number	1	2	3	4	6	8	10	13	14	17	20
Length (cm)	20	21	23	24	25	30	32	35	36	37	39

- Construct a scatterplot and a line of best fit of the data.
- Ari did not measure the rabbit in weeks 5, 7, 9, 11, 12, 15, 16, 18 and 19. Use the line of best fit to predict the rabbit's length at those times.
- Were the predictions in part (b) an example of interpolation or extrapolation?
- (MP) Predict the length of the rabbit in the next three weeks (i.e. weeks 21 – 23), using the line of best fit.
- (MP) Are the predictions made in part (d) reliable? Explain?
- Develop a regression equation which could be used to find the length of the rabbit.

21) A regression equation that predicts height from foot size is $h = 4s + 65$ where h and s are in cm.

- a) What is the expected height of a person with foot size of:
 i) 20 cm ii) 25.5 cm iii) 32 cm
- b) What is the expected foot size of a person whose height is:
 i) 150 cm ii) 165 cm iii) 220 cm
- c) (MP) What do you think were the minimum and maximum values of foot size 's' that can be used in this equation? Explain your answer?

22)

The average growth of 100 trees was measured over a period of ten years at a particular plantation and the results tabulated against the rainfall in the previous year.

Rainfall, year N (mm) (x)	963	1235	840	864	986	1134	927	1083	760	925
Average tree growth, year $N + 1$ (mm) (y)	1680	2100	1630	1550	1780	1980	1780	2000	1590	1610

- (a) Plot the data on a scatter diagram and draw a line of best fit.
 (b) From the regression line find the increase in growth per 100 mm rainfall.
 (c) Do these figures provide an argument for or against irrigating plantation trees?
 (d) From the data provided, is it possible to conclude that tree growth in any year depends on the previous year's rainfall?

23)

These are the figures for higher court criminal convictions and for liquor licences in force at the end of each year in Queensland. (Source: Queensland Year Book 1991)

Year	Liquor licences in force (x)	Higher court criminal convictions (y)
1980	2518	1143
1981	2605	1243
1982	2719	1263
1983	2830	1434
1984	2928	1784
1985	2968	2177
1986	3046	2538
1987	3233	2619
1988	3352	2795
1989	3483	2861

- (a) Round each figure to the nearest 100. Draw a scatter diagram and on it draw a line of best fit.
 (b) Discuss the apparent correlation between these two variables. Is it reasonable to conclude that the number of higher court criminal convictions depends on the number of liquor licences in force?

6) 15.38 2.67, 15.13 3.09, 13.88 3.68, 13.63 3.62

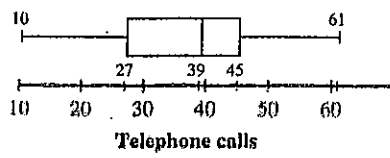
ANSWERS

1) a) 40 b) i) 154.2 cm ii) 158.2 cm c) 156.4 cm d) 15 e) i) 152.5 cm ii) 160.5 cm f) 158.5 cm g) 160 cm

2) 65.5 3) 70.1 4) 70.1 5) 59.4 6) 82.5 7) a) $x + y = 15$ b) $y = 7.5$



9) range = 7; mean = 16.48; median = 16; mode = 16
IQR = 4



10) a) 39, $Q_1 = 27$, $Q_3 = 45$ b)

11) a) Physics, b) Maths, c) Biology d) Chemistry e) Chemistry f) Physics g) 50% h) Maths
range is shortest but higher, the median is highest etc. 12) A,C,D; H,F,B; 1,J,E 13) a) mean = 11.55; median = 10; mode = 8 b) mean = 36; median = 36; mode = 33, 41 c) Mean = 72.18; median = 72 mode = 72. 14)

Class Interval	Frequency
20 - 29	1
30 - 39	4
40 - 49	5
50 - 59	3
60 - 69	5
70 - 79	4
80 - 89	5
90 - 99	3
Total	30

15)

Key: 1|6 = 16 calculators

Graphics calculator	Leaf	Stem	Leaf	Scientific calculator
	9 6 3 2	0		6 7 8
	9 8 7 5 2 0	1		0 1 5 8
	9 6 4 4 0	2		0 3 6 8
	6 3 0	3		0 2 5 8 9
		4		1 3

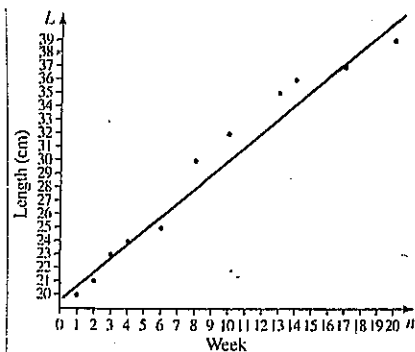
16) a) Mean = 19.2 $\sigma = 7.9$ b) Mean = 4.59 $\sigma = 1.45$ 17) a) mean = 32.03; median = 29.5 b) and c)

Class	f	cf	35 - 39	3	21
0 - 4	0	0	40 - 44	3	24
5 - 9	2	2	45 - 49	0	24
10 - 14	2	4	50 - 54	0	24
15 - 19	5	9	55 - 59	3	27
20 - 24	4	13	60 - 64	1	28
25 - 29	2	15	65 - 69	2	30
30 - 34	3	18	Total	30	

d) 15 - 19 e) between 25 - 29 and 30 - 34 f) $s = 17.8$ or $\sigma = 17.5$

18) a) independent = number of hours dependent = test results b) independent = running speed dependent = heart rate. 19) a) i) 12.5 ii) 49 b) i) 12 ii) 22.5 20)

20) a)



b) 25 cm; 27 cm; 29 cm; 31 cm; 33 cm; 36 cm; 37 cm; 38 cm; 40 cm

c) interpolation because one is reading in between points on the scatterplot.

d) Extending the line of best fit the rabbit would be 42 cm, 43 cm, 44 cm

e) The predictions could be reliable if the rabbit continues to grow but if it has reached its adult length the results would not be reliable. The results were obtained by extrapolation which could be misleading particularly if the rabbit has stopped growing.

f) A regression equation could be: a gradient of length $37 - 24 = 13$ divided by $17 - 4 = 13$.

$$L = w + 20 \text{ (gradient is } \frac{13}{13} = 1)$$

21) a) i) 145 ii) 167 iii) 193 b) i) 21.25 ii) 25 cm iii) 33.75

c) The minimum height would be could not be lower than 65 cm and would probably be near a metre as a child of 65 cm would probably wear a shoe of more than 8 cm and the maximum would be 200 cm with a shoe size of 34 cm. Therefore the minimum value of s would be about 8 cm and the maximum would be close to 34 cm.

Remember: the revision sheet should be worked on BUT it is important to go over your notes, the summaries at the end of each relevant chapter, the exercises in the text and chapter reviews. You need to revise the entire course as indicated in the chapters to be tested.