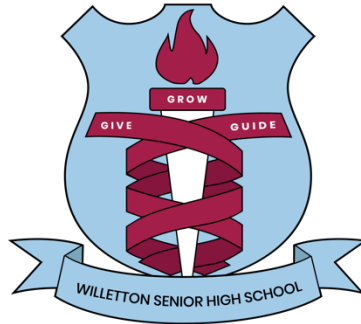


MATHEMATICS APPLICATIONS

YEAR 11 UNIT 2

TEST 3

2022



PART A

CALCULATOR FREE

TIME: 30 mins

MARKS: 32 marks

STUDENT'S NAME: _____

CIRCLE YOUR

TEACHER'S NAME:

Mr Galbraith

Mr Stillitano

Mr Riemer

Dr Duan

Miss Colquhoun

Mrs Regi

MATERIALS SUPPLIED:

Formula Sheet

Question 1**[4 marks]**

Classify each of the following variables described below, by entering its letter A to L in the most appropriate column in the table.

Numerical and discrete	Numerical and continuous	Categorical and nominal	Categorical and ordinal

A: The finishing position in a 100m race.

B: Number of left-hand students in a classroom

C: The blood group of a person

D: The number of teeth with fillings

E: The length of a swimming pool.

F: The number of people attending a football match

G: Favourite food

H: Weight of a fish

I: The hair colour of Irish females

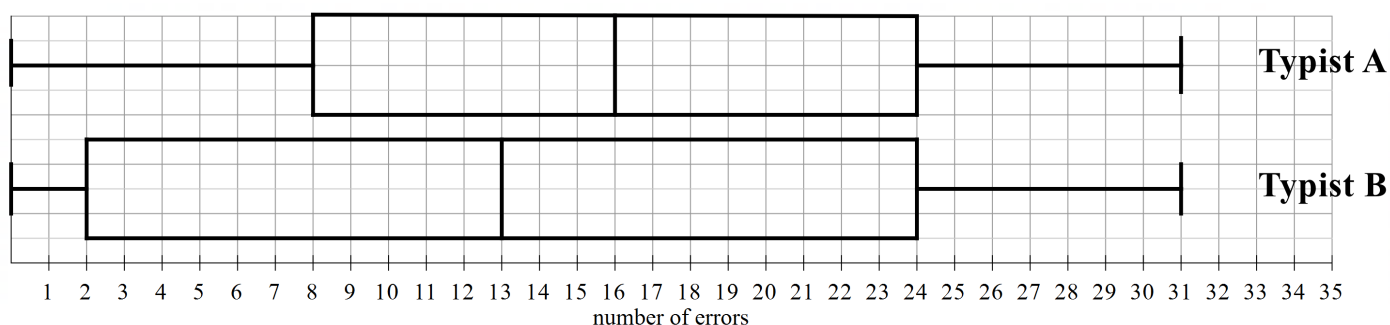
J: Income level as high, medium, or low

K: Academic letter grades

L: Heights

Question 2**[4 marks]**

The parallel box plots below show the distribution of the number of errors made by typist A and typist B.



a) State one major difference in the number of errors made by these two typists and explain in context what this difference means?

(2)

b) Which typist would be expected to have the greater mean number of errors? Justify.

(1)

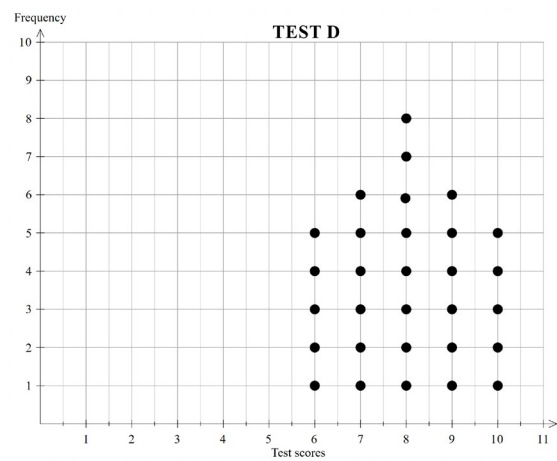
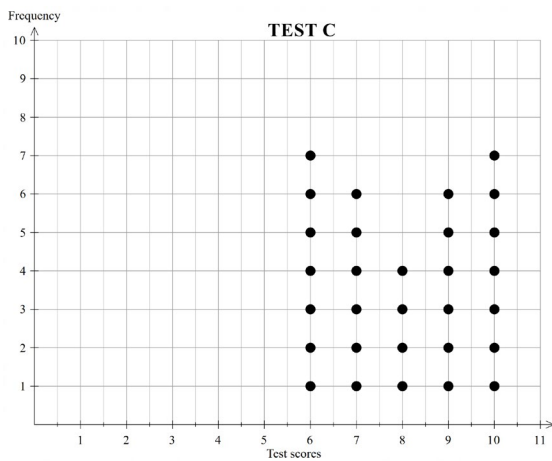
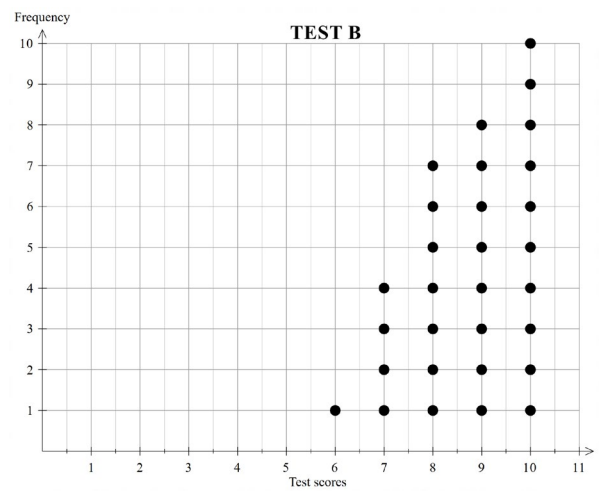
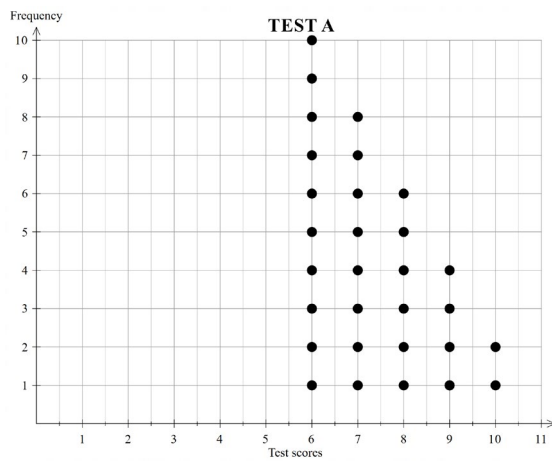
c) Which typist would be expected to have the greater standard deviation of number of errors? Justify.

(1)

Question 3

[8 marks]

The test results for four different tests A, B, C and D for the same class of students are shown in the graphs below:



Note: Calculations are not required to answer the following questions.

- Which tests have the same mean?
- Which test has the smallest mean?
- Which tests have the same median?
- Which test has the largest median?
- Which test has the smallest mode?
- Which test has the smallest standard deviation?
- Which tests have a symmetrical distribution?
- Which test has a positive skew?

Question 4**[16 marks]**

The heights of the starting five players in basketball teams A and B are shown below.

Team A	
Player	Height(cm)
1	212
2	185
3	183
4	182
5	179

Team B	
Player	Height(cm)
1	188
2	186
3	183
4	182
5	181

a) Formula: $variance = \frac{\sum(x-\bar{x})^2}{n}$

Find the variance for team B, given that the mean for team B is 184 cm. (Show working)

(3)

b) How would you find the standard deviation from the variance for team B?

(1)

c) Complete the following table

(5)

	Team A(cm)	Team B(cm)
Sum of heights	941	
Mean height		184
Median height		183
Range in height	33	
Interquartile range	18	
Standard deviation (1 decimal place)	12.1	2.6

d) On average, which team has the taller players? Justify.

(1)

e) Which team had the greater variation of heights? Justify.

(1)

f) Justify mathematically whether the height of 212 cm for team A is an outlier.

(3)

g) Give one limitation of the mean as a statistical measure.

(1)

h) Give one reason why the standard deviation is a better measure of dispersion than the range.

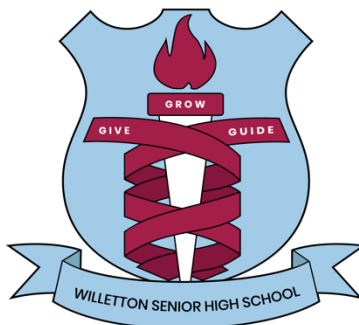
(1)

MATHEMATICS APPLICATIONS

YEAR 11 UNIT 2

TEST 3

2022



PART B

CALCULATOR ASSUMED

TIME: 25 mins

MARKS: 26 marks

STUDENT'S NAME:

CIRCLE YOUR

TEACHER'S NAME:

Mr Galbraith

Mr Stillitano

Mr Riemer

Dr Duan

Miss Colquhoun

Ms Regi

MATERIALS SUPPLIED:

Formula Sheet

MATERIALS RECOMMENDED:

Up to three approved calculators

One A4 single sided unfolded page of notes

Question 5

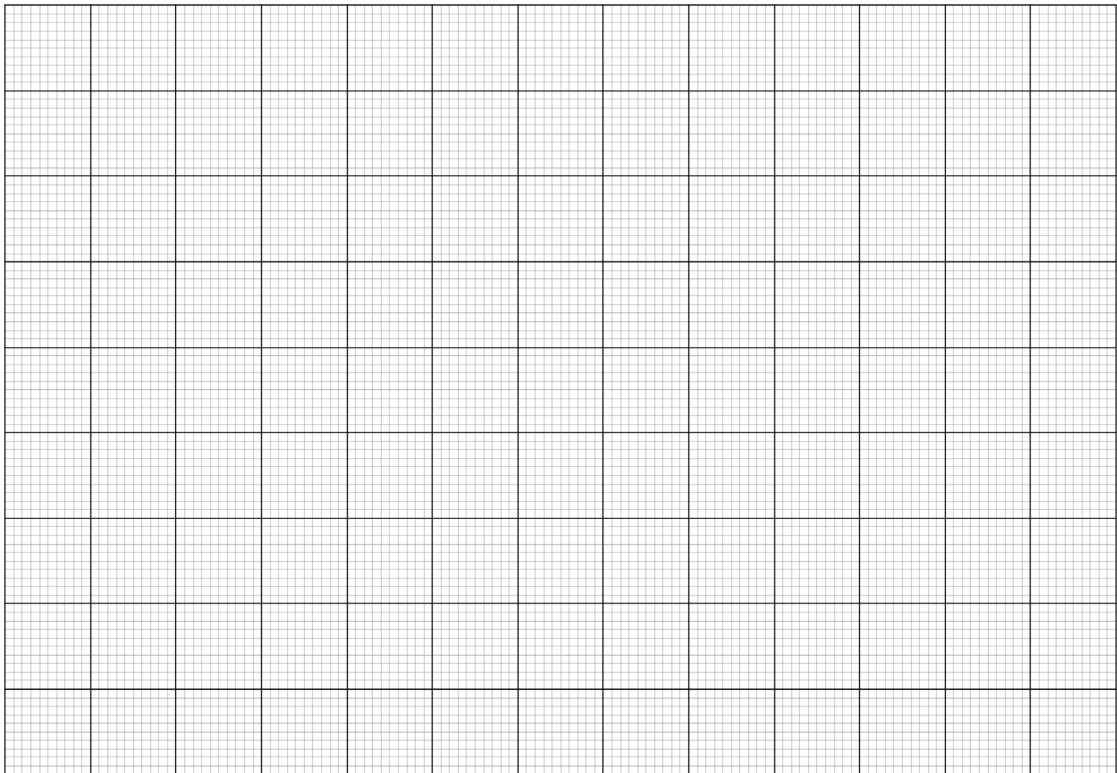
[17 marks]

Several year 11 students were surveyed regarding the number of hours they spent studying in the week before the Semester One Examinations. The results are tabled below.

Number of hours(x)	$0 \leq x < 5$	$5 \leq x < 10$	$10 \leq x < 15$	$15 \leq x < 20$	$20 \leq x < 25$	$25 \leq x < 30$
Number of students	12	15	26	38	21	18

a) Construct a frequency histogram for the given data below.

(5)



b) Complete the table below to show the statistics for the number of hours studied by these year 11 students. (6)

Number of students	
Estimated mean	
Modal class	
Median class	
Estimated range	
Estimated Standard deviation	

- c) Describe the distribution of the times spent studying in the week before the Semester One Examinations by this group of year 11 students.

(4)

- d) One year 11 student, claiming to have studied 39 hours per week before the exams, was added to this group.

How, and by how much, will the inclusion of this student's hours affect the standard deviation of the original group of year 11 students? Justify.

(2)

Question 6

[9 marks]

A major road runs through suburbs A and B. Both suburbs are of similar size and population density with a speed limit of 70 km/h along the major road. The speeds of cars in suburb A and suburb B have been recorded on a split stem back-to-back stemplot below.

Speed of cars(km/h)		
Suburb A		Suburb B
	5H	6 8
4 2 1 0 0	6L	0 2 3 3 4 4 4
8 7 6 5 5 5	6H	5 5 6 6 6 7 8 8 9
4 4 3 2 2 0	7L	0 0 0 2 2 3 3 4
8 8 6 5 5 5	7H	5 5 5 6 7 8 8
4 2 1 0 0	8L	2
8 7 6 6 5 5	8H	
0	9L	

Key: 5H|6 means 56 km/h

H means high

L means low

- a) Describe the shape of the distribution for suburb A.

(1)

- b) Complete the following table for suburb B.

(4)

	Speeds in suburb A(km/h)	Speeds in suburb B(km/h)
Mean	74.5	
Median	75	
Interquartile range	16	
Standard deviation	8.8	

- c) Which suburb is it safer to drive in? Provide mathematical justifications.

(4)