~ MARKING GUIDE ~

Eastern Goldfields College

Yr 11 Essentials Mathematics

Statistics Investigation 2018

Working Time: 120 mins **CALCULATORS ARE ALLOWED** Total Marks: ~~73~~ 74

"The Average Student"

You have been asked to collate, analyse and interpret a sample of data taken from the *CensusAtSchool* site.

The data has been organised into two summary sheets. These are the categorical data and numerical data summary sheets. **Decide which sheet is which before you start your tasks.**

In order to describe the "AVERAGE" student we need to calculate some statistics and collate some data related to physical attributes of these students, what these students do and what they like.

CATEGORICAL DATA

Use the data provided to answer the following questions.

1. Complete the table below for birth month. (4 marks)

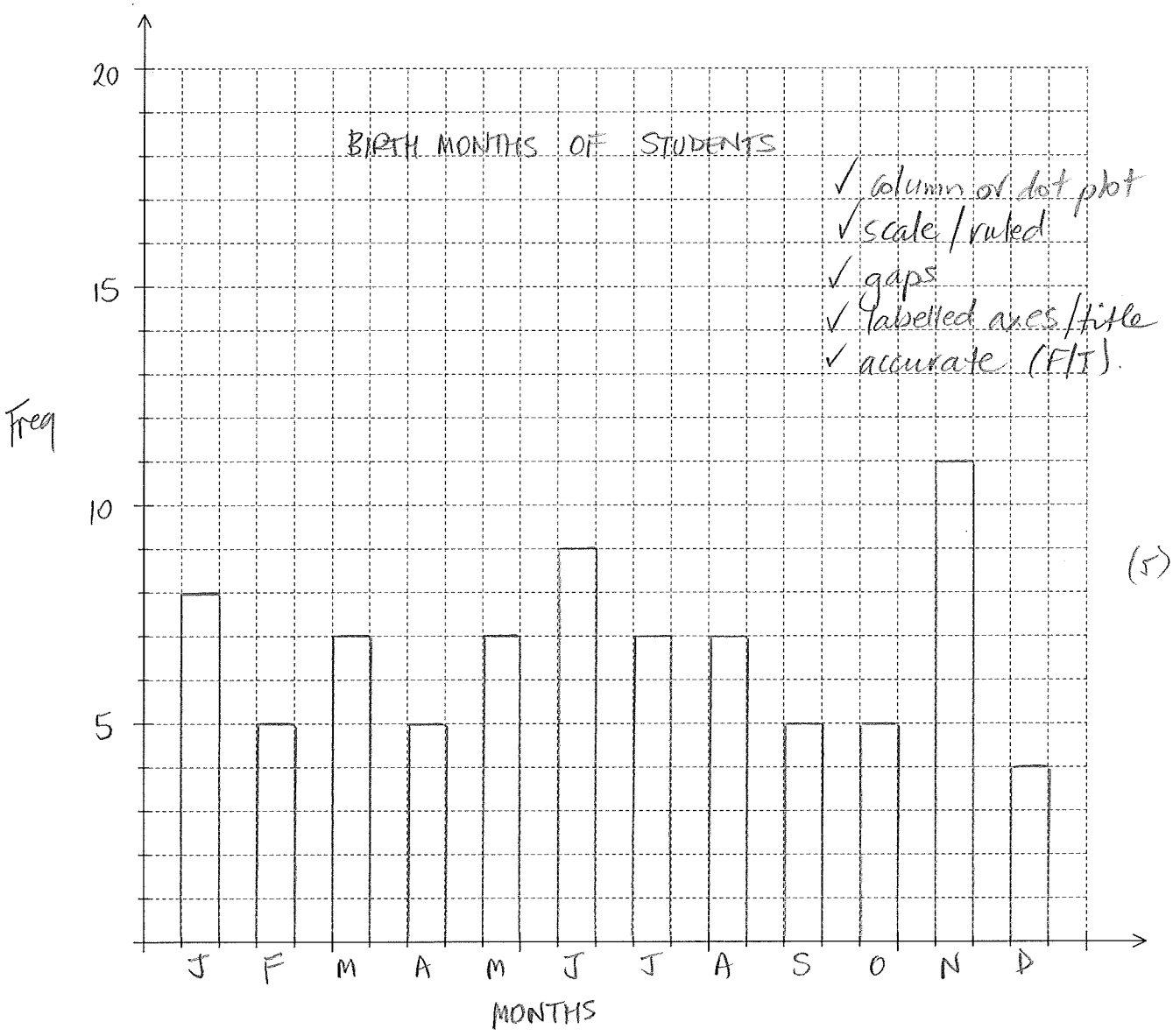
Month	Tally	Frequency
January	𝍸 III	8
February	𝍸	5
March	𝍸 II	7
April	𝍸	5
May	𝍸 II	7
June	𝍸 IIII	9
July	𝍸 II	7
August	𝍸 II	7
September	𝍸	5
October	𝍸	5
November	𝍸 𝍸 I	11
December	IIII	4
		80

✓ total adds to 80
✓ 6 mths correct
✓ 9 mths correct
✓ all correct

(4)

5

2. Draw a suitable graph to display the birth months for the 80 students. (4 marks)



(5)

3. What is the modal birth month? (1 mark)

NOVEMBER ✓

4. What percentage of students were born after June 30? (2 marks)

✓ $\frac{39}{80} \times 100 = 48.75\%$ ✓

5. What fraction of students were born in January? (1 marks)

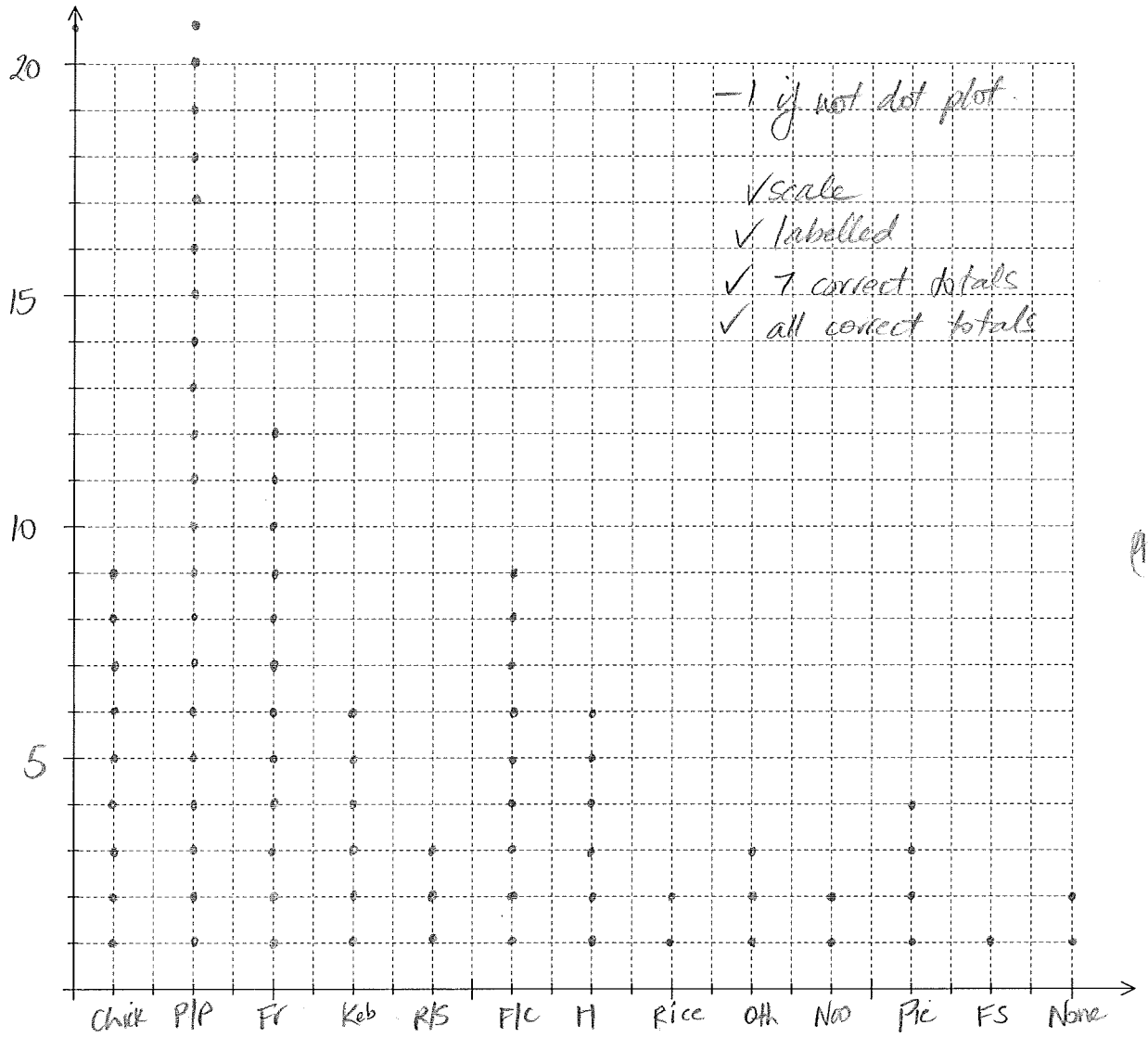
$\frac{8}{80} = \frac{1}{10}$ ✓

6. Which month were the fewest students born? (1 mark)

DECEMBER ✓

(5)

7. Construct a dot plot to display "Favourite Take Away Food" (4 marks)



(4)

8. What is the most popular take away food from the data presented? (1 marks)

PIZZA / PASTA ✓

9. Which ~~three~~ foods ~~were~~ is the least popular amongst the students? (1 marks)

FRUIT SALAD ✓

10. The percentage of students who said chips was their favourite is twice the percentage of those who said hamburgers was their favourite. TRUE or FALSE

(1 marks)

✓

11. What is the % difference between the most popular and least popular take away food?

(2 marks)

$21/80 \rightarrow 26.25\%$ ✓ $\quad 1/80 \rightarrow 1.25\%$ ✓ $\quad$ DIFF = 25% ✓

(5)

12. Complete the following frequency tables for the remaining data. (8 marks)

EYE COLOUR	TALLY	TOTAL
Blue	𝍸 𝍸 𝍸 ||||	19
Brown	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||||	39
Hazel	𝍸 𝍸	10
Green	𝍸 𝍸	10
Grey	|	1
Other	|	1
		80

The most common eye colour is BROWN

HOW TRAVEL TO SCHOOL	TALLY	TOTAL
Car	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||||	39
Walk	𝍸 𝍸 |||	13
Bus	𝍸 𝍸 𝍸 ||||	19
Train/Tram	𝍸 |||	8
Bicycle	|	1
		80

(8)

The most common method of travel to school is CAR

FAVOURITE SPORT	TALLY	TOTAL
Football (Soccer)	𝍸 𝍸 |	11
Football (AFL)	𝍸	5
Football (Rugby)	|||	3
Basketball	𝍸	5
Athletics	||||	4
Swimming	𝍸 |	6
Netball	𝍸 |||	8
Dancing	𝍸 ||	7
Cycling	|	1
Cricket	||	2
Tennis	|||	3
Martial Arts	|||	3
Gymnastics	||||	4
Hockey	||	2
Other	𝍸 𝍸	10
None	𝍸	5
Baseball/Soft	|	80

The most popular sport is FOOTBALL (Soccer)

✓ each most common (right/wrong - must have all 3 correct from their table)

(per table) → ✓ for each tally match total ✓ if correct

-1 if total not 80.

✓ all correct

NUMERICAL DATA

Use the data provided to complete the following:

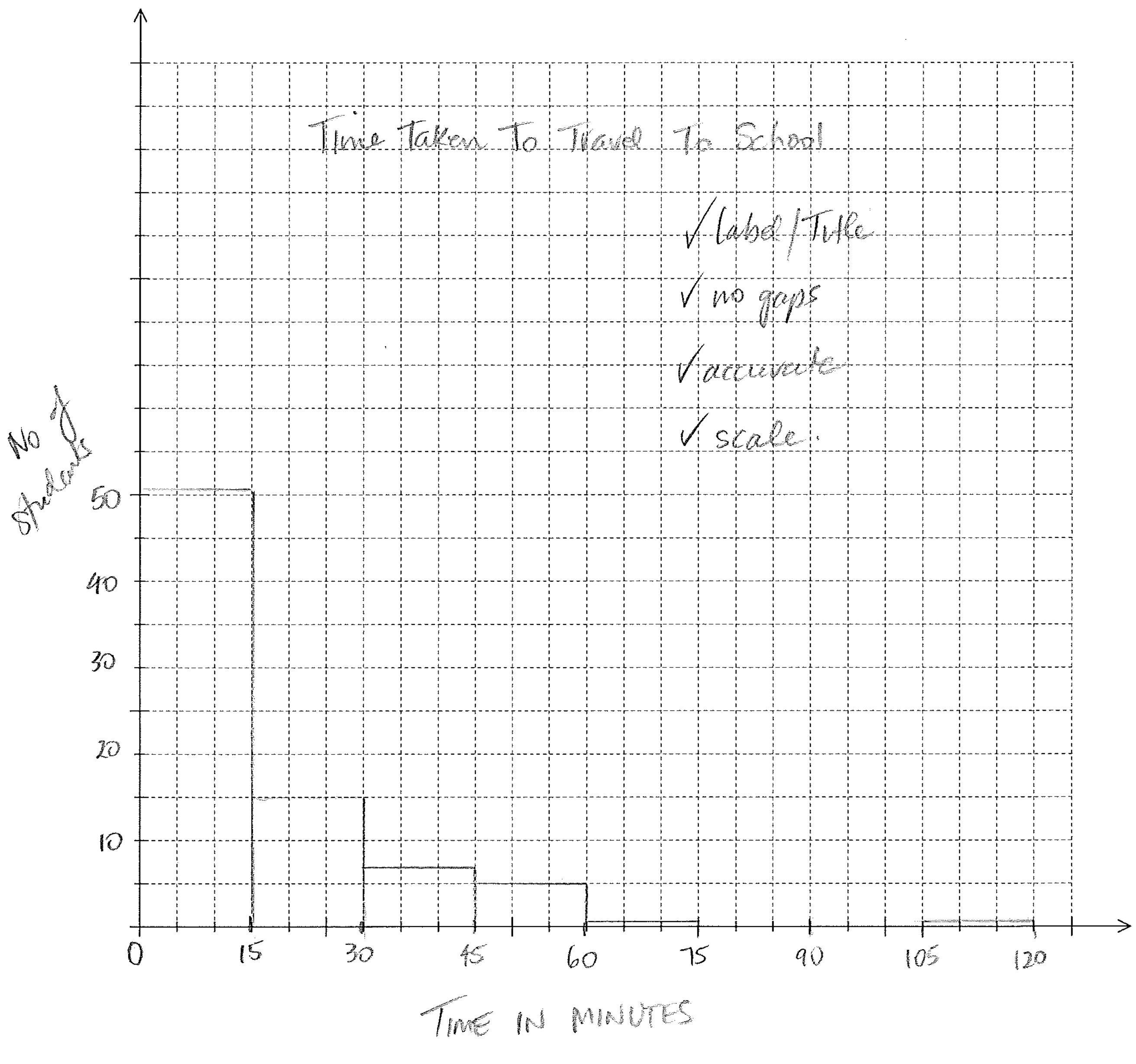
Complete the frequency table below for time taken to travel to school. (4 marks)

Time in minutes	Tally	Frequency
0 – 15	卌 卌 卌 卌 卌 卌 卌 卌 卌 卌 |	51
15 - 30	卌 卌 卌	15
30 – 45	卌 ||	7
45 – 60	卌	5
60 – 75	|	1
75 – 90		0
90 – 105		0
105 – 120	|	1
N.B. 0 – 15 means more than 0 up to and including 15		80

✓ total 80
✓ 4 rows correct
✓ 6 rows correct
✓ all correct

(4)

1. Construct a histogram for the time taken for the students to travel to school. (4 marks)



(4)

2. Describe the distribution of your histogram. (2 marks)

Skewed ✓, Gap from 75 – 105 ✓ any 2 appropriate comments

3. State the time of the slowest and quickest student and hence calculate the range of the time taken for students to travel to school. (2 marks)

110 minutes slowest
1 minute quickest ✓ Range = 109 ✓

4. Calculate the mean time taken by the students. (2 marks)

700 ÷ 80 = 17.5 minutes
✓ ✓

5. What percentage of students took between 0 and 30 minutes to travel to school? (2 marks)

$\frac{66}{80} \times 100 = 82.5\%$
✓ ✓

6. Why is a histogram a good way to display this data? (1 mark)

The data is measured and not counted ✓

or Data is between intervals

(9)

(7) 6. Compare the hours spent on homework to the hours spent on video games by completing a five number summary for each and then constructing two 'box and whisker plots' on the grid below. (10 marks)

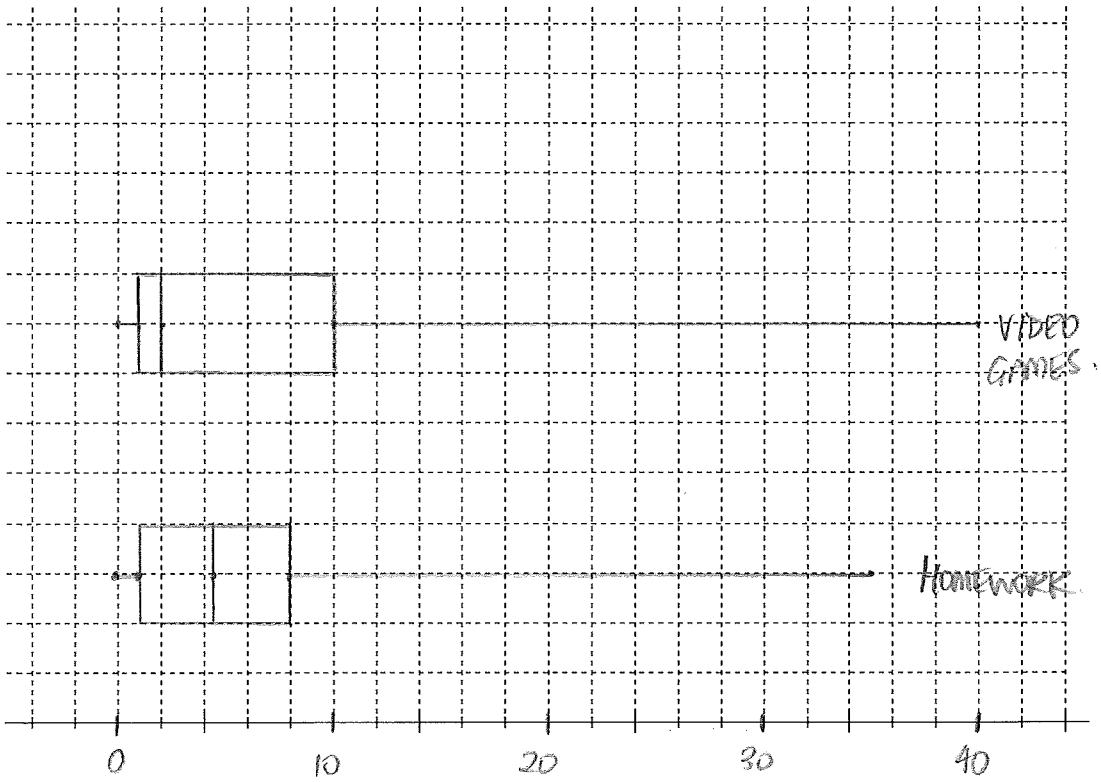
HOMEWORK

Min = 0
Q_1 = 1
Med = 4.5
Q_3 = 8
Max = 35

VIDEO GAMES

Min = 0
Q_1 = 1
Med = 2
Q_3 = 10
Max = 40

✓✓ min/max
✓✓ med
✓✓ Q1/Q3
W Box plot each must match their stats.



(10)

7. What is the interquartile range for the hours spent on homework? (1 mark)

7 ✓

8. Which set has a greater standard deviation? How do you know? (2 marks)

✓ VIDEO GAMES AS IT IS MORE SPREAD OUT ✓

9. 25% of students spend more than 10 hours on video games

TRUE or FALSE (1 mark)

✓

10. Consider students 12 and 43.

i) What is the difference in their week's pay? (1 mark)

500 − 144 = $356 ✓

ii) What is their height difference? (1 mark)

143 − 136 = 7cm ✓

iii) Student 43 takes twice as long to get to school as student 12.

TRUE or FALSE (1 mark)

✓

11. What is the range of all the student heights? 206 − 60 = 146cm ✓ 2

i) Is there an outlier(s) Yes ✓ (1 mark)

ii) How do you know? Justify your answer with calculations. (2 marks)

130 − 60 = 70 70cm lower than next height

206 − 188 = 18 18 " more " " "

✓ ✓

choose one or both with reason.

(11)

iii) Draw a stem and leaf display for the heights of the students. (Remove any outliers in the data first) (60 and 206) (3 marks)

stem ✓

13	02446
14	0123336 88
15	00024556668888899
16	00222233344445566677788 9
17	00000222233578 89
18	0000288
19	
20	6

✓ leaves correct

✓ leaves in order

12. Using the statistics you have calculated describe the "Average Student" (2 marks)

The average student is born in November. Their favourite food is pizza/pasta and they have brown eyes. They travel to school by car and their favourite sport is soccer. They take 17.5 minutes on average to get to school and spend 4.5 hrs on HW and 2 hrs on video games per week.

(160 – 169 cm tall)

✓✓ mention 4 of their stats

✓ mention at least 2 of their stats

END OF INVESTIGATION

(5)