Student Name: _____

GENERAL MATHEMATICS 2024

Unit 3
Key Topic Test 2 – Data Analysis Investigating association between 2 variables

Recommended writing time: 45 minutes
Total number of marks available: 25 marks

QUESTION BOOK

* The recommended writing time is a guide to the time students should take to complete this test. Teachers may wish to alter this time and can do so at their own discretion.

Conditions and restrictions

- Students are permitted to bring into the room for this test: pens, pencils, highlighters, erasers, sharpeners and rulers, approved CAS calculator and one bound reference book.
- Students are NOT permitted to bring into the room for this test: blank sheets of paper and/or white out liquid/tape.

Materials supplied

- Question and answer book of 9 pages.

Instructions

- Print your name in the space provided on the top of the front page.
- All written responses must be in English.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic communication devices into the room for this test.

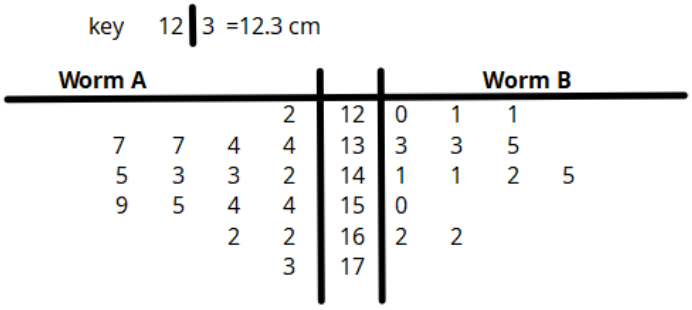
SECTION A – Multiple-choice questions

Instructions for Section A

- All questions are worth one mark.
- Answer all questions by circling the correct response.
- Marks are not deducted for incorrect answers.
- No marks will be awarded if more than one answer is completed for any question.

Use the following information to answer Question 1 and Question 2

The length of two species of worm found in the earth were recorded in the stem plot below.



Question 1

Which of the following is the most accurate comparison of spread of the distributions of Worm A and Worm B?

A. Worm B had a larger spread as shown by a higher range than Worm A.

B. Worm B had a larger spread as shown by an interquartile range 0.05 larger than Worm A.

C. Both worm types had the same spread as shown by the interquartile range.

D. Worm B has a higher mean than Worm A.

E. Worm A had more data collected than Worm B.

Question 2

Which of the following is the best comparison of the centre of the distributions of Worm A and Worm B?

A. Worm B had a larger IQR than Worm A.

B. Worm B had a higher mean of 14.7cm compared to Worm A mean of 13.9cm.

C. Worm A had a higher centre, shown by the median of 14.4 compared to 14.1 for Worm B.

D. Worm A is negatively skewed, compared to Worm B which is positively skewed.

E. Worm B has a higher centre than Worm A.

Use the following information to answer Question 3 and Question 4

The following table shows survey results from students at a local high school.

Revision lectures are effective	**Gender**	
	Male	Female
Agree	220	150
Neutral	140	60
Disagree	40	90
Total	400	300

Question 3

The percentage of males who agree that revision lectures are effective is:

A. 50%
B. 41%
C. 23%
D. 55%
E. 62%

Question 4

Which of the following is an accurate statement?

A. The data supports that there is a relationship between gender and opinion about revision lectures effectiveness as the percentage of each are similar.
B. The data supports that there is a relationship between gender and opinion about revision lectures effectiveness as the percentage of those that agree is quite similar at around 50%.
C. The data supports that there is a relationship between gender and opinion about revision lectures effectiveness as the percentage of those that disagree differs with Males 10% and Females 30%.
D. The data does not support that there is a relationship between gender and opinion about revision lectures effectiveness as the percentage of those that disagree differs with Males 10% and Females 30%.
E. The data does not support that there is a relationship between gender and opinion about revision lectures effectiveness as the percentage of those that agree is quite similar at around 50%.

Question 5

In a survey, data was collected for the following two variables.

Age group ($20 - < 25$ years, $25 - < 30$ years, $30 - < 35$ years, 35 years or more)

Type of camping (caravan, campervan, tent, camper trailer)

The variables *Age group* and *Type of camping* are

A. both nominal variables.

B. both ordinal variables.

C. numerical variable and a categorical variable respectively.

D. ordinal variable and a nominal variable respectively.

E. a nominal variable and an ordinal variable respectively.

SECTION B - Short-answer questions

Instructions for Section B

- Answer each question in the space provided.
- Please provide appropriate workings and use exact answers unless otherwise specified.

Question 1 (4 marks)

The percentages of people with different relationship status in two age groups; less than 50 years old and more than or equal to 50 years old; are recorded below.

Relationship Status	< 50	≥ 50
Single (never married)	22	8
Married	44	54
Divorced	34	38

a. State the explanatory variable.

_____

1 mark

b. If there were 420 people under 50 surveyed, how many were married?

_____

_____

1 mark

c. Does the information given support the contention that relationship status is associated with age? Give appropriate statistical information to support your answer.

_____

_____

_____

2 marks

1 + 1 + 2 = 4 marks

Question 2 (10 marks)

The height (cm) and weight (kg) of 10 players on a football team and 10 players on a basketball team are displayed in the table below.

Football	Basketball
180	192
175	211
180	199
179	194
190	188
192	204
180	195
177	188
186	190
168	185

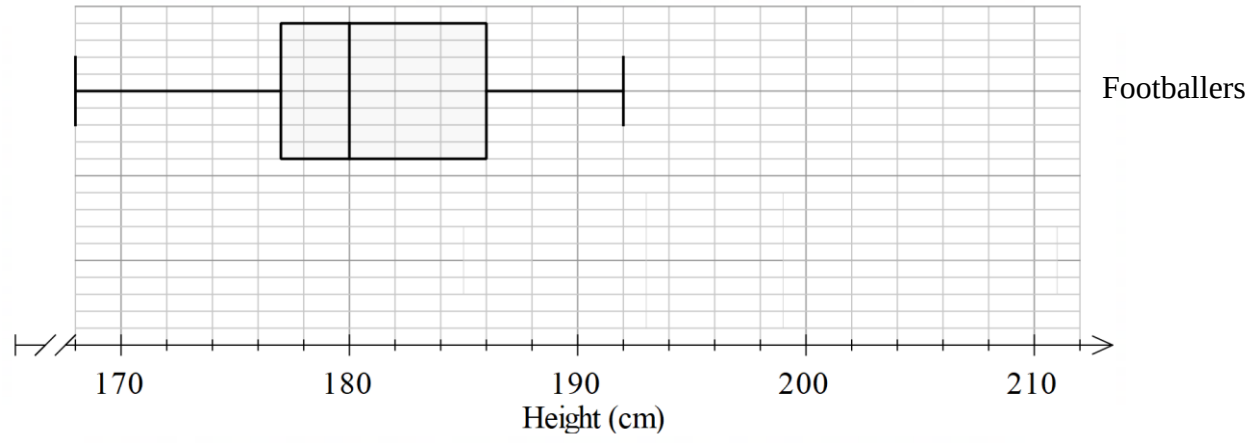
a. Find the mean height for the 10 footballers

_____

1 mark

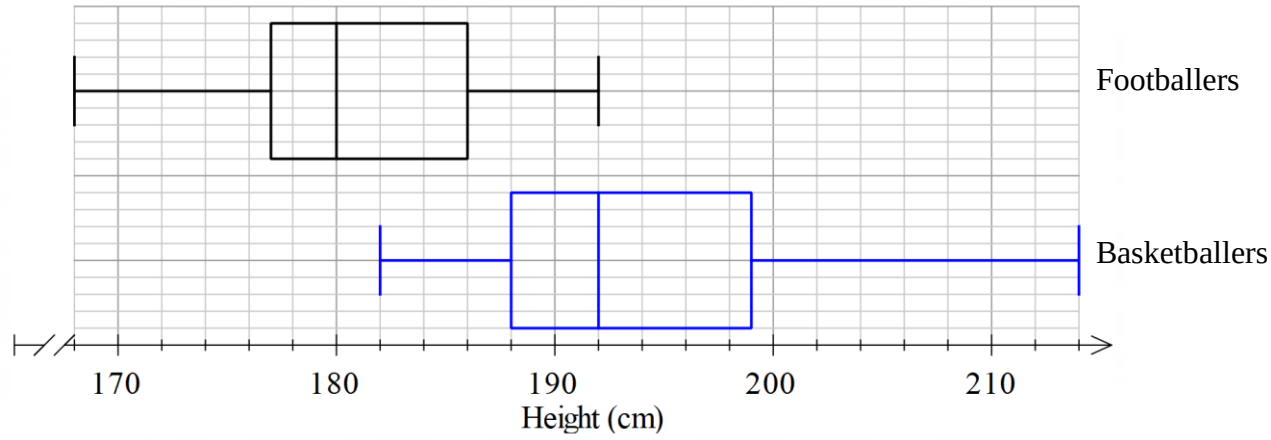
b. The boxplot for Footballers is shown below. State the 5 figure summary for Basketballers and sketch the boxplot for basketballers parallel to Footballers below.

Minimum	Q_1	Median	Q_3	Maximum



4 marks

The heights of 10 players on a Football team and 10 players on a **different** basketball team are compared in the parallel boxplots below.



c. Using an appropriate statistic, compare the centre of heights of Footballers and Basketballers.

_____

_____

_____

2 marks

d. Using an appropriate statistic, compare the spread of heights of Footballers and Basketballers.

_____

_____

_____

2 marks

e. Describe the shape of distribution of heights of the 10 basketballers.

_____

1 mark

1 + 4 + 2 + 2 + 1 = 10 marks

Question 3 (6 marks)

Two groups of people are assigned a problem solving activity. Prior to solving the problem each group was given a different physical activity for 30 minutes. Group A went for a gentle walk and Group B completed a strenuous activity course.

The stem plot below shows the distribution of times for people in each group to complete the problem solving activity.

key 1 | 2 =12 minutes

Group A		Group B
8, 8, 7	0	
4, 3, 1, 0	1	8, 9
2	2	0, 2, 4, 5, 8, 9

a. Use an appropriate statistic to compare the spread of Group A and Group B.

_____

_____

_____

2 marks

b. Use an appropriate statistic to compare the centre of Group A and Group B.

_____

_____

2 marks

c. Does the data collected support the contention that there is an association between someone's ability to complete a problem solving activity and the activity they were doing immediately before hand? Give reasons for your answer.

_____

_____

2 marks

2 + 2 + 2 = 6 marks

END OF KEY TOPIC TEST