Data Representation and Interpretation

7
Unit Test

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Instructions: Read all questions carefully to ensure you understand what is being asked. When completing your official tests / exams, your grade will be based upon your: **understanding, fluency, reasoning, and problem solving,** so ensure you show all lines of working and draw accurate, labelled diagrams where necessary. (ACiQ|9.0 Mathematics standard elaborations found on final page (general assessment marking standards)). [Practise tests are marked out of a score of 10]. For multiple choice questions, tick or fill in the circle next to the corresponding letter under the question.

Check your work if you have time. *Remember:* you don't have to start at question one, it's always best to firstly look through the test, highlight the easy looking questions and complete them first, then secondly, go back through and work on the harder questions. Good luck! And remember to breathe!

$$\sum = \frac{}{10} = \quad \%$$

Part 1: Multiple Choice (2 marks)

Question 1:

a) Which type of graph would be best to show the change in temperature over a week?

A. Bar Graph   **B.** Pie Chart   **C.** Line Graph   **D.** Histogram

○ **A**   ○ **B**   ○ **C**   ○ **D**

Space for Q1a...

b) What is the primary purpose of a pie chart?

A. To show comparisons between categories at a single point in time.
B. To illustrate changes over time.
C. To highlight the relationship between two numerical variables.
D. To represent frequency distribution.

○ **A**   ○ **B**   ○ **C**   ○ **D**

Space for Q1b...

Question 2:

a) Calculate the mean of the following dataset: { 7, 7, 7, 7, 7, 7, 7, }

A. 49   **B.** No mean   **C.** 7   **D.** 0

○ **A**   ○ **B**   ○ **C**   ○ **D**

Space for Q2a...

b) Calculate the mode of the following dataset: { 7, 7, 7, 7, 7, 7, 7, }

A. 49   **B.** No mode   **C.** 7   **D.** 0

○ **A**   ○ **B**   ○ **C**   ○ **D**

Space for Q2b...

Part 2: Short Answer (4 marks)

Question 3:

a) Explain the difference between a bar graph and a histogram.

b) You collected data on the number of pets owned by students in your class:
0 pets: 15 students
1 pet: 10 students
2 pets: 5 students
3+ pets: 3 students

Create a frequency table for this data.

Question 4:

a) Find the median and mode of the numbers: $0.3, 0.5, 0.1, 0.6, 0.4, 0.2$.

b) Given the following two datasets, determine which one has the greatest range:
Set A: { $10, 5, 15, 20, 8$ **}.**
Set B: { $10, 0, 10, 20, 8$ **}.**

Part 3: Problem Solving (4 marks)

Question 5:

a) A survey was conducted on 40 students about their favourite type of movie:

Action: 10 students
Comedy: 15 students
Drama: 8 students
Horror: 7 students

Design a bar chart to represent this information.

Earnings ($)	Number of Workers
50 - 100	5
101 - 150	8
151 - 200	12
201 - 250	3
251 - 300	2

b) The data in the table to the above shows weekly earnings of part-time workers.

Construct a histogram for this data.

Question 6:

a) A teacher recorded the test scores of 7 **students :** $45, \; 85, \; 90, \; 55, \; 75, \; 95, \; 80$ **. Using the following table :**

Numerical Score	Letter Grade
≥ 90	A
70 to < 90	B
50 to < 70	C
< 50	D

Classify each students grade as either an A, B, C or D, then calculate the mean, median, mode, and range of these scores and determine the classes average as an A, B, C, or D .

b) Two year 7 mathematics classes were competing against each other and both took the same test to determine which had advanced the most throughout the Term.

Class α's scores are : 58, 72, 75, 95, 100 **.**
Class β's scores are: 65, 65, 75, 80, 85 **.**

Compare the mean, median, mode, and range to describe the performance of each class.

Solutions

1a. (0.5 marks)

C. Line Graph - Line graphs are ideal for displaying trends over time, like temperature changes.

b. (0.5 marks)

A. To show comparisons between categories at a single point in time.
- Pie charts represent parts of a whole.

2a. (0.5 marks)

C. 7 .

$$Mean = \frac{49}{7} .$$

b. (0.5 marks)

C. 7 .

$$Mode = Most\ Common .$$

3a. (1 mark)

A bar graph compares different categories by the length of their bars, and the bars can be separated. Each bar represents a discrete category or item.

A histogram shows continuous data in terms of frequency distribution, with bars touching each other to indicate that the data is grouped into ranges or bins.

b. (1 mark)

Number of Pets	Frequency
0	15
1	10
2	5
3	3

4a. (1 mark)

First, arrange the numbers in ascending order: $0.1, 0.2, 0.3, 0.4, 0.5, 0.6$.
Since there's an even number of values, the median is the average of the two middle numbers:

Median :

$$= \frac{0.3 + 0.4}{2}$$

$$= 0.35 .$$

Mode :
There isn't a repeating number so there is no mode .

b. (1 mark)

> **Set A**:
> Arrange in order: { 5, 8, 10, 15, 20 }.
> Range = highest value - lowest value $= 20 - 5 = 15$.
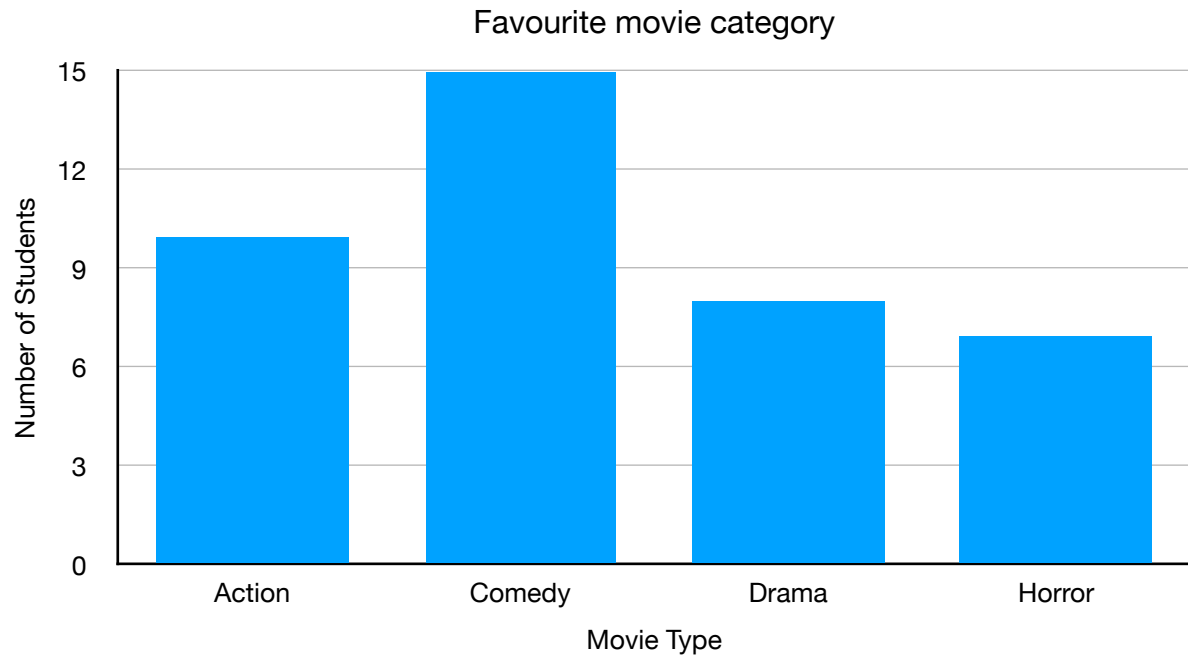> **Set B**:
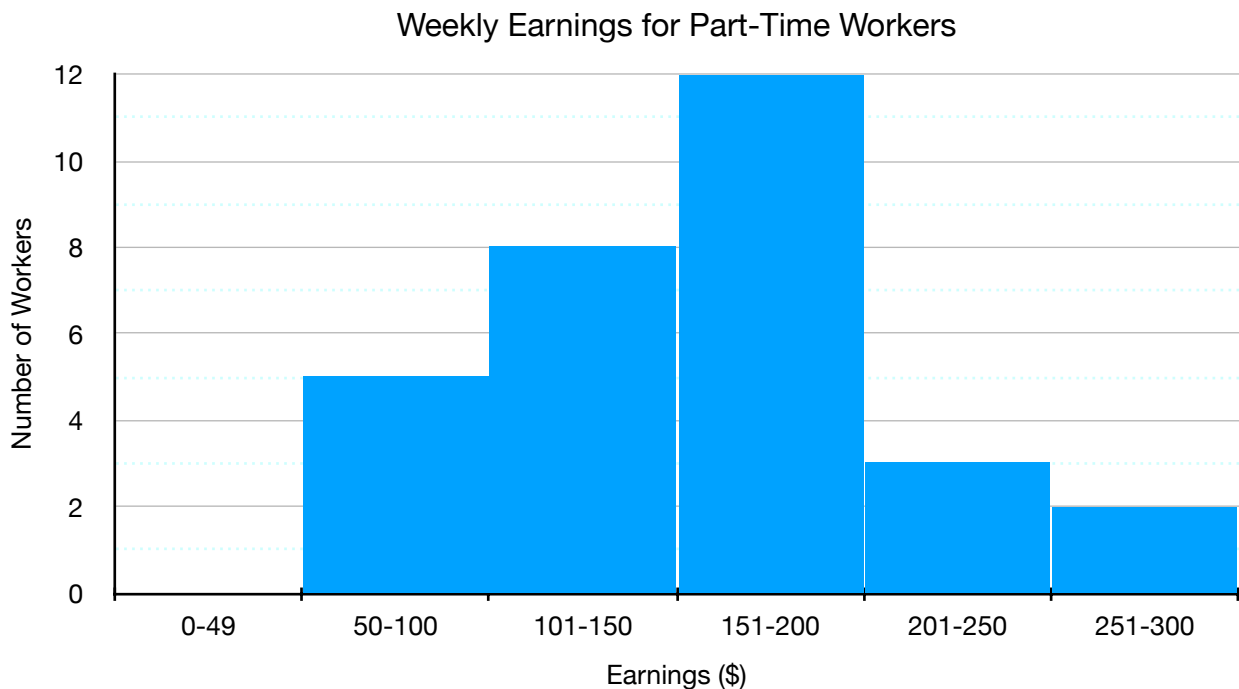> Arrange in order: { 0, 8, 10, 10, 20 } .
> Range = highest value - lowest value $= 20 - 0 = 20$.
> Set B has the greatest range of 20 , compared to 15 .

5a. (1 mark)

Favourite movie category

Number of Students vs *Movie Type*

Movie Type	Number of Students
Action	10
Comedy	15
Drama	8
Horror	7

b. (1 mark)

Weekly Earnings for Part-Time Workers

Number of Workers vs *Earnings ($)*

Earnings ($)	Number of Workers
0-49	0
50-100	5
101-150	8
151-200	12
201-250	3
251-300	2

6a. (1 mark)

Ordered: 45, 55, 75, 80, 85, 90, 95 → D, C, B, B, B, A, A

$$\text{Mean} = \frac{45 + 85 + 90 + 55 + 75 + 95 + 80}{7}$$

$$= \frac{525}{7}$$

$$= 75 \, .$$

Median: Ordered: 45, 55, 75, 80, 85, 90, 95 . Median $= 80$,

Mode: No mode since all numbers are unique,

Range: $95 - 45 = 50$.

There are two averages for the class set, the Mean $= 75$, and the Median $= 80$, indicating that the classes overall average is somewhere between these scores. As they both lie in the 'B' classification (i.e. they are both between 70 and < 90), the classes overall average grade would be 'B' .

b. (1 mark)

Class α:

Mean: $\dfrac{58 + 72 + 75 + 95 + 100}{5} = 80$,

Median: 75 ,

Mode: No mode,

Range: $100 - 58 = 42$.

Class β:

Mean: $\dfrac{65 + 65 + 75 + 85 + 80}{5} = 74$,

Median: 75 ,

Mode: 65 ,

Range: $80 - 65 = 15$.

Interpretation: Class α has a higher mean, and equal medians, suggesting better overall performance, but with a larger range indicating more variation in scores. Class β has a lower mean, with scores more concentrated around two common values, showing less variation. It is hard to tell which has advanced the most as there are no previous grades / scores to compare to.

$$\sum = \frac{}{10} = \%$$

General Assessment Marking Standards

Remember: When your official tests are marked, they won't be a score out of 10, they will be a grade (A,B,C,D,E) based on the following standards:

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Year 7 Mathematics standard elaborations

		A	B	C	D	E
		The folio of student work contains evidence of the following:				
Mathematical proficiencies	Understanding	accurate and consistent identification, representation, description and connection of mathematical concepts and relationships in complex unfamiliar, complex familiar, and simple familiar situations	accurate identification, representation, description and connection of mathematical concepts and relationships in complex familiar and simple familiar situations	identification, representation, description and connection of mathematical concepts and relationships in simple familiar situations	partial identification, representation and description of mathematical concepts and relationships in some simple familiar situations	fragmented identification, representation and description of mathematical concepts and relationships in isolated and obvious situations
	Fluency	choice, use and application of comprehensive facts, definitions, and procedures to find solutions in complex unfamiliar, complex familiar, and simple familiar situations	choice, use and application of effective facts, definitions, and procedures to find solutions in complex familiar and simple familiar situations	choice, use and application of facts, definitions, and procedures to find solutions in simple familiar situations	choice and use of partial facts, definitions, and procedures to find solutions in some simple familiar situations	choice and use of fragmented facts, definitions and procedures to find solutions in isolated and obvious situations
	Reasoning	comprehensive explanation of mathematical thinking, strategies used, and conclusions reached in complex unfamiliar, complex familiar, and simple familiar situations	detailed explanation of mathematical thinking, strategies used, and conclusions reached in complex familiar and simple familiar situations	explanation of mathematical thinking, strategies used, and conclusions reached in simple familiar situations	partial explanation of mathematical thinking, strategies used, and conclusions reached in some simple familiar situations	fragmented explanation of mathematical thinking, strategies used, and conclusions reached in isolated and obvious situations
	Problem-solving	purposeful use of problem-solving approaches to find solutions to problems.	effective use of problem-solving approaches to find solutions to problems.	use of problem-solving approaches to find solutions to problems.	partial use of problem-solving approaches to make progress towards finding solutions to problems.	fragmented use of problem-solving approaches to make progress towards finding solutions to problems.

Key	shading emphasises the qualities that discriminate between the A–E descriptors

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