Year 10 Mathematics

AOS 6 Revision [10.1] - Mock CAT 2

Version B

Total Marks:	51 marks
Time Allowed:	60 minutes
Instructions:	Answer all questions
	Show all working
	Calculators permitted for Tech-Active questions

Student Name: _____

Class: _____

Section A: Short Answer Questions (35 marks)

Question 1 [1 mark]

Calculate the range of the data set: {8, 3, 12, 5, 9, 2}

Question 2 [2 marks]

A standard six-sided die is rolled. What is the probability of rolling a number less than 3?

Question 3 [2 marks]

Find the mean and the median of the following data: 8, 14, 10, 6, 12

Question 4 [2 marks]

For the following data set: {12, 15, 18, 20, 22, 25, 28}

Find the five-figure summary (Min, Q■, Median, Q■, Max).

Question 5 [3 marks]

The two-way table below shows the preferred lunch for a group of Year 10 students.

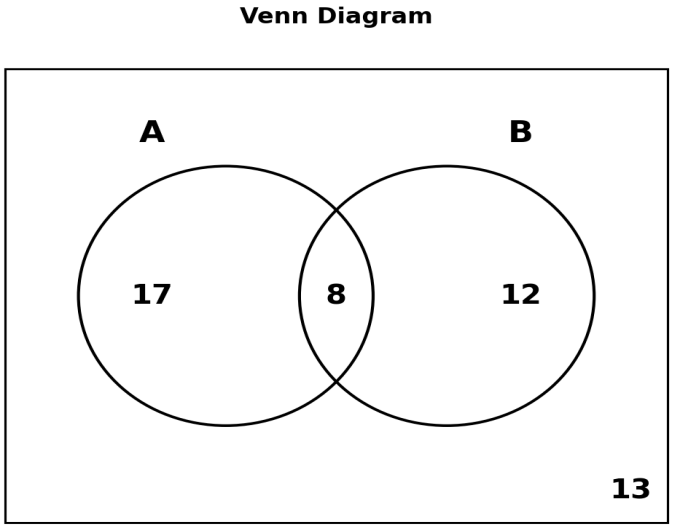
	Sandwiches	Pasta	Total
Boys	22	14	36
Girls	18	16	34
Total	40	30	70

a. How many girls prefer pasta? [1 mark]

b. A student is chosen at random. What is the probability that the student is a boy who prefers sandwiches? [2 marks]

Question 6 [2 marks]

Consider the Venn diagram below:



Find the probability of P(A ∩ B).

Question 7 [2 marks]

If P(A) = 0.5, P(B) = 0.4 and P(A ∪ B) = 0.7, find P(A ∩ B).

Question 8 [2 marks]

Two events, A and B, are such that P(A) = 2/5, P(B) = 1/3 and P(A ∩ B) = 2/15. Determine whether events A and B are independent. Justify your answer.

Question 9 [2 marks]

Draw a box plot for the data represented by the following five-figure summary:

Minimum = 8, Q■ = 15, Median = 22, Q■ = 28, Maximum = 35.

Question 10 [2 marks]

The number of books read by students in a month are recorded below:

2, 5, 3, 8, 4, 6, 3, 5, 7, 4

An outlier is a data point that lies outside the range [Q■ - 1.5 × IQR, Q■ + 1.5 × IQR]. Identify any outliers in the given data set.

Question 11 [3 marks]

A bag contains 4 red balls and 5 blue balls. A student randomly picks one ball, does not replace it, and then picks a second ball.

Draw a tree diagram to represent all the possible outcomes, showing the probabilities on the branches.

Question 12 [4 marks] ***Tech-Active***

The table below shows the age (in years) of a car and its value (in thousands of dollars).

Age of Car (x)	1	2	3	4	5
Value $000 (y)	18	16	13	11	8

a. Describe the correlation between the age of the car and its value. [1 mark]

b. The line of best fit passes through the points (1, 18) and (5, 8). Find the equation of this line. Give your answer accurate to one decimal place. [2 marks]

c. Use your equation to predict the value of a car that is 3.5 years old. [1 mark]

Question 13 [3 marks] ***Tech-Active***

A teacher records the number of hours students spent on homework in a week. The data set is: {3, 4, 5, 6, 7}.

The mean is given as 5.

a. Calculate the population variance for this data set. Give your answer in exact form. [2 marks]

b. Hence, find the population standard deviation. Give your answer correct to two decimal places. [1 mark]

Question 14 [5 marks]

A bag contains 7 green marbles and 3 yellow marbles.

a. A marble is drawn at random from the bag. What is the probability that it is green? [2 marks]

b. Two marbles are drawn from the bag without replacement. What is the probability that one marble is green and the other is yellow? (Hint: consider the two possible orders). [3 marks]

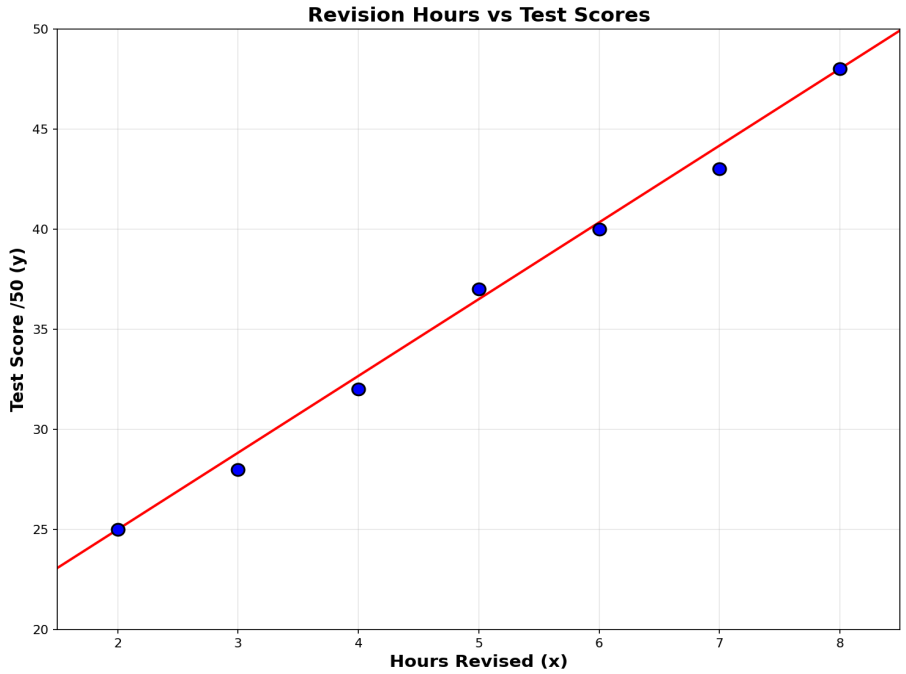
Section B: Extended Response Questions (16 marks)

Question 15 [7 marks] ***Tech-Active***

A science teacher records the hours students spent revising and their test scores. The data for 7 students is shown below.

Hours Revised (x)	2	3	4	5	6	7	8
Test Score /50 (y)	25	28	32	37	40	43	48

a. Construct a scatterplot of the data on the grid below. [2 marks]



b. Describe the correlation between the hours revised and the test score. [1 mark]

c. A line of best fit for this data passes through the points (2, 25) and (8, 48). Find the equation of this line. Give your answer both in exact form and rounded to four decimal places. [2 marks]

d. Use your equation to predict the test score for a student who revised for 5.5 hours. [1 mark]

e. Use your equation to predict the test score for a student who revised for 12 hours. Give your answer correct to the nearest integer. Comment on the reliability of this prediction. [1 mark]

Question 16 [9 marks]

The daily temperatures (°C) for two cities, City X and City Y, recorded over two weeks are displayed in the back-to-back stem-and-leaf plot below.

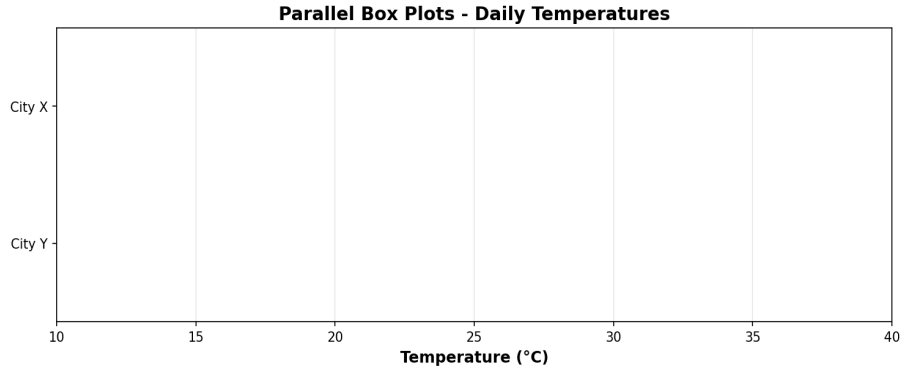
Daily Temperatures (°C) - City X and City Y

City X	Stem	City Y
9 7 3	1	5 8
8 6 4 2 0	2	1 3 5 7 9
5 2	3	0 4 6 8

Key: 1 | 5 means 15°C

a. Determine the five-figure summary for both City X and City Y. [3 marks]

b. On the axes below, draw parallel box plots to compare the temperatures of the two cities. [2 marks]



c. For City X, calculate the mean and range. [3 marks]

d. Write a brief statement comparing the temperatures of the two cities. Refer to at least one measure of centre and one measure of spread in your comparison. [1 mark]

END OF TEST