IB Maths SL mini Topic Exam: Statistics & Probability

Recommended Time: 40mins.                      Total Mark: 48

Student Name: ____________________________    Teacher: ______________

Question 1

[Maximum mark: 5]  

There are 8 items in a data set. The sum of the items is 48.

(a) Find the mean.                       [2]

The variance of this data set is 2. Each value in the set is multiplied by 3.

(b) (i) Write down the value of the new mean.    [3]

(ii) Find the value of the new variance.

Working

/5
Question 2

[Maximum mark: 6]

(a) Find the correlation coefficient. [2]

This data can be modelled by the regression line with equation \( y = ax + b \).

(b) Write down the value of \( a \) and \( b \). [2]

(c) Use the regression line to estimate the amount of fuel the car would use if it has driven 55 km. [2]
Question 3

[Maximum mark: 7]  

The time taken for a student to finish a task is normally distributed with a mean $\mu$ and standard deviation $\sigma$. It is found that 6% of students take less than 7 minutes to complete the task and 75% take less than 22 minutes.

Find the value of $\mu$ and of $\sigma$.

Working

\[ \frac{7}{7} \]
Question 4

[Maximum mark: 15]

In a group of 25 students, 18 take chemistry and 12 take physics. Three students take neither chemistry nor physics. The Venn diagram below shows the events chemistry and physics. The values \( p, q, r \) and \( s \) represent numbers of students.

\[
\begin{array}{c}
\text{Chemistry} \\
\text{Physics}
\end{array}
\]
\[ p \quad r \quad q \]
\[ s \]

(a) (i) Write down the value of \( s \).
(ii) Find the value of \( r \).
(iii) Write down the value of \( p \) and \( q \). [5]

(b) (i) A student is selected at random. Given that the student studies chemistry, write down the probability they study physics.
(ii) Hence, show that studying chemistry and physics are not independent events. [5]

(c) Two students are selected at random one after the other. Find the probability the first student studies only chemistry and the second student studies only physics. [5]
Question 5

[Maximum mark: 15]  📄

The weights of frogs in an enclosure is normally distributed with a mean of 230 grams and a standard deviation of 15 grams.

A frog that weighs less than 210 grams is considered a small frog.

(a) A frog is chosen at random. Find the probability it is a small frog.  [3]

A frog that weighs more than 250 grams is considered a big frog.

(b) Find the probability a randomly selected frog is neither small nor big.  [4]

Frogs that aren’t small or big are considered standard frogs. A sample of 450 frogs are selected.

(c) What is the expected number of standard frogs from the sample?  [3]

(d) Another sample of $n$ frogs are selected. Find the minimum value for $n$ such that 100 standard frogs is expected in the sample.  [5]

Working
Working

/15