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IB Exam Revision - Online

Topic Exam

Statistics & Probability

Video Solutions to this exam can be found at:


www.revisionvillage.com/statistics-probability-exam

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Our aim is to simplify the process of revising for IB Exams

Topic Exam – Statistics & Probability

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.

(ii) Find the value of the new variance. [3]

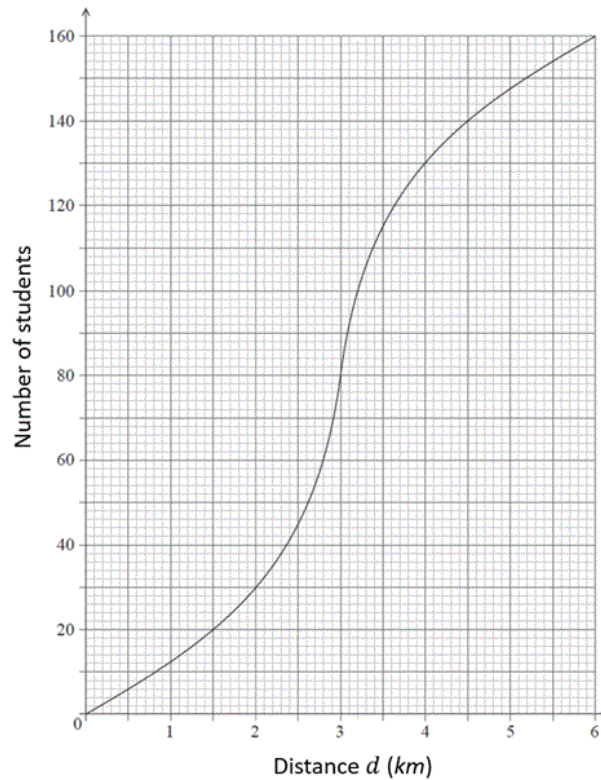
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Question 2

[Maximum mark: 7]



The following cumulative frequency diagram shows the distance students need to travel to get to school.



- (a) Find the median distance a student travels to school. [2]
- (b) Find the number of students that travel between 2 and 4 km to get to school. [3]
- (c) Find the percentage of students that travel more than 4.5 km to get to school. [2]

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Question 3

[Maximum mark: 6]



The following table shows the amount of fuel (y litres) used by a car to travel certain distances (x km).

Distance travelled (x km)	14	35	80	115	145	170
Fuel used (y litres)	2.5	6.2	10.8	13.6	15.4	19.7

- (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]

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Question 4

[Maximum mark: 6]

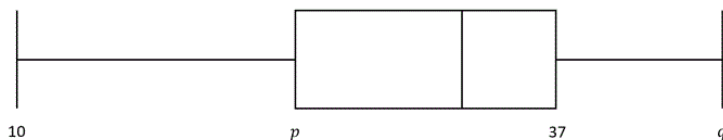


A school conducts a research into how many minutes each day their students spend browsing the internet. Jake's class is studied first. The number of minutes spent browsing the internet by each student in Jake's class is shown in the following stem and leaf plot.

Stem	Leaf	Key: 2 3 represents 23 minutes
1	0, 4, 8	
2	3, 5, 8, 9	
3	1, 3, 3, 6, 6, 8	
4	0, 4, 5	

- (a) (i) Write down the number of students in Jake's class.
- (ii) Find the median number of minutes spent browsing the internet. [3]

The following box-and-whisker plot also displays the number of minutes spent browsing the internet by students in Jake's class.



- (b) (i) Write down the value of q .
- (ii) The interquartile range is 13. Find the value of p . [3]

Question 5

[Maximum mark: 6]



A bias coin has a probability of showing Heads as 0.7. Jim pays \$20 to play a game where he flips the coin. He gets no money if he flips a Heads and gets \$ k if he flips a Tails. The game is fair. Find the value of k .

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Question 6

[Maximum mark: 7]



The time taken for a student to finish a task is normally distributed with a mean μ and standard deviation σ . 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 μ and of σ .

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Question 7

[Maximum mark: 6]



The probability of obtaining “Heads” when a bias coin is tossed is 0.65. The coin is tossed seven times. Find the probability of obtaining

- (a) at least four heads; [3]
- (b) the fourth tail on the seventh toss. [3]

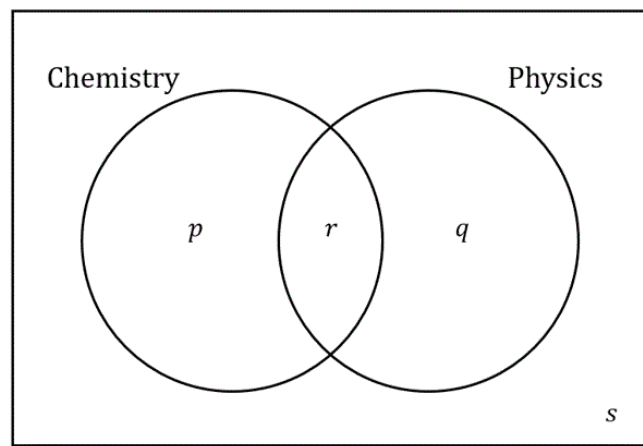
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Question 8

[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.



- (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]

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Question 9

[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]

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Question 10

[Maximum mark: 15]



The following table shows the price (y dollars) of six used trucks, depending on the distance they've travelled (x km)

Distance travelled (x km)	15 000	60 000	185 000	115 000	95 000	140 000
Price (y dollars)	80 000	65 000	30 000	50 000	58 000	35 000

The relationship between x and y can be modelled by the regression equation $y = ax + b$.

- (a) (i) Find the correlation coefficient. [3]
- (ii) Write down the value of a and b . [3]
- (b) Use the regression equation to estimate the price of a truck that has travelled 160,000 km. [3]

James buys the truck that has travelled 160,000 km, however doesn't drive it. The price of the truck decreases by 7% each year it sits still in James's garage.

- (c) Calculate the price of James's truck after 5 years. [4]
- (d) If James sells his truck for 20,000 dollars n years after he purchased it, find the value of n to the nearest year. [5]