

Please check the examination details below before entering your candidate information

Candidate surname		Other names	
Centre Number		Candidate Number	

Pearson Edexcel Level 3 GCE

Friday 23 May 2025

Afternoon

Paper reference **8MA0/21**

Mathematics

Advanced Subsidiary

PAPER 21: Statistics

You must have:
Mathematical Formulae and Statistical Tables (Green), calculator

Total Marks

Candidates may use any calculator allowed by Pearson regulations. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- You should show sufficient working to make your methods clear.
Answers without working may not gain full credit.
- Values from statistical tables should be quoted in full. If a calculator is used instead of tables the value should be given to an equivalent degree of accuracy.
- Inexact answers should be given to three significant figures unless otherwise stated.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- The total mark for this part of the examination is 30. There are 5 questions.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- If you change your mind about an answer, cross it out and put your new answer and any working underneath.
- Check your answers if you have time at the end.

Turn over ►

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1. The random variable $X \sim B(20, 0.37)$

(a) Find $P(X = 8)$

(1)

(b) Find $P(X \leq 5)$

(1)

(c) Find $P(X \leq 5.7)$

(1)

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Question 1 continued

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(Total for Question 1 is 3 marks)

2. Jasper is investigating the relationship between Daily Mean Pressure and Daily Mean Windspeed (Beaufort conversion) for Perth in 2015 using the data from the large data set.

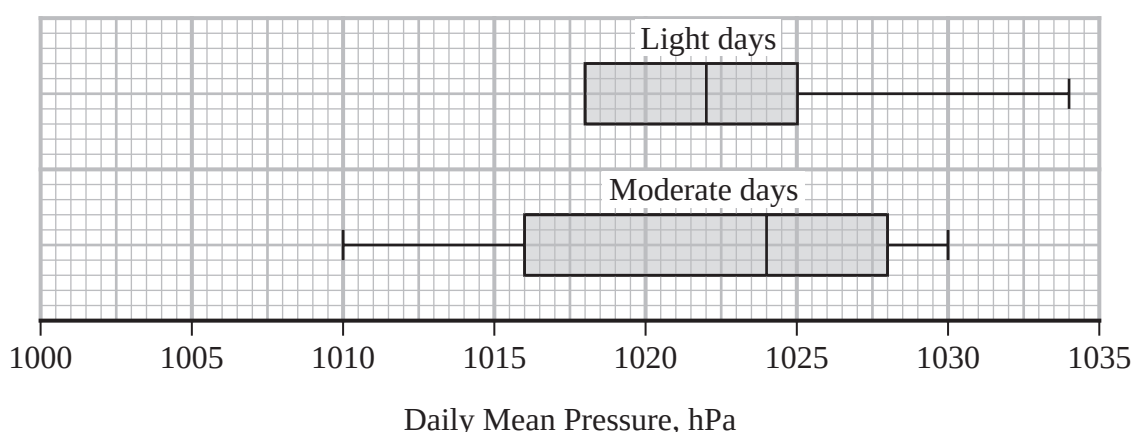
Treating the large data set for Perth in 2015 as the population, Jasper decides to use all the data available.

- (a) Write down the name given to this method of data collection.

(1)

All of the Daily Mean Windspeed data for Perth in 2015 are classed as either “Light” or “Moderate”.

Jasper splits the data for Perth in 2015 into Light days and Moderate days and draws a box plot for each set of data, but omits the lower tail for Light days.



The smallest three values of Daily Mean Pressure for Light days for Perth in 2015 are 1007, 1009 and 1010 hPa.

An outlier in the first quartile is defined as any value more than $1.5 \times \text{IQR}$ below Q_1

- (b) (i) Determine if there are any outliers in the first quartile of Daily Mean Pressure for Light days.

(2)

- (ii) Hence, complete the box plot of Daily Mean Pressure for Light days.

(1)

The box plot for Light days is based on data for 161 days.

- (c) Using your knowledge of the large data set, estimate the number of Moderate days with a Daily Mean Pressure of 1028 hPa and higher in the large data set for Perth in 2015.

(2)



Question 2 continued

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(Total for Question 2 is 6 marks)

Question 3 continued

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(Total for Question 3 is 9 marks)

Question 4 continued

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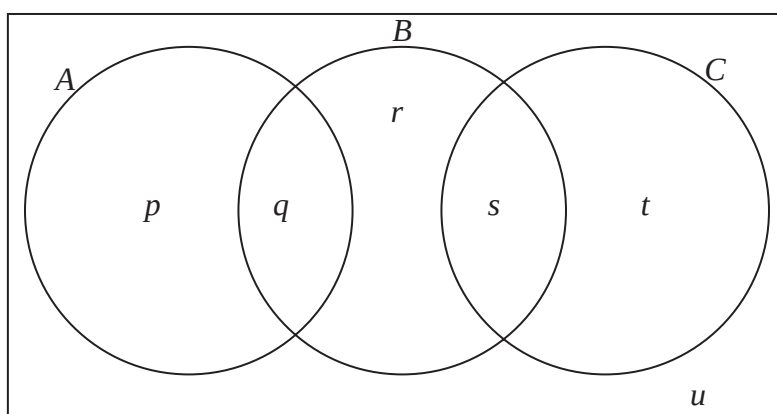
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(Total for Question 4 is 5 marks)

5. Events A , B and C are such that

- $P(A \text{ or } C) = 0.55$
- the probability that none of the events occur is 0.23
- the probability that exactly two of the events occur is 0.18
- A and B are independent
- $P(B) = P(A) + 0.1$

The Venn diagram represents the events A , B and C and their associated probabilities p , q , r , s , t and u



(a) Write down the value of u

(1)

(b) Find the value of r

(2)

(c) Find

- the value of p
- the value of q
- the value of s
- the value of t

(4)



Question 5 continued

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Question 5 continued

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(Total for Question 5 is 7 marks)**TOTAL FOR STATISTICS IS 30 MARKS**