

© International Baccalaureate Organization 2025

All rights reserved. No part of this product may be reproduced in any form or by any electronic or mechanical means, including information storage and retrieval systems, without the prior written permission from the IB. Additionally, the license tied with this product prohibits use of any selected files or extracts from this product. Use by third parties, including but not limited to publishers, private teachers, tutoring or study services, preparatory schools, vendors operating curriculum mapping services or teacher resource digital platforms and app developers, whether fee-covered or not, is prohibited and is a criminal offense.

More information on how to request written permission in the form of a license can be obtained from <https://ibo.org/become-an-ib-school/ib-publishing/licensing/applying-for-a-license/>.

© Organisation du Baccalauréat International 2025

Tous droits réservés. Aucune partie de ce produit ne peut être reproduite sous quelque forme ni par quelque moyen que ce soit, électronique ou mécanique, y compris des systèmes de stockage et de récupération d'informations, sans l'autorisation écrite préalable de l'IB. De plus, la licence associée à ce produit interdit toute utilisation de tout fichier ou extrait sélectionné dans ce produit. L'utilisation par des tiers, y compris, sans toutefois s'y limiter, des éditeurs, des professeurs particuliers, des services de tutorat ou d'aide aux études, des établissements de préparation à l'enseignement supérieur, des fournisseurs de services de planification des programmes d'études, des gestionnaires de plateformes pédagogiques en ligne, et des développeurs d'applications, moyennant paiement ou non, est interdite et constitue une infraction pénale.

Pour plus d'informations sur la procédure à suivre pour obtenir une autorisation écrite sous la forme d'une licence, rendez-vous à l'adresse <https://ibo.org/become-an-ib-school/ib-publishing/licensing/applying-for-a-license/>.

© Organización del Bachillerato Internacional, 2025

Todos los derechos reservados. No se podrá reproducir ninguna parte de este producto de ninguna forma ni por ningún medio electrónico o mecánico, incluidos los sistemas de almacenamiento y recuperación de información, sin la previa autorización por escrito del IB. Además, la licencia vinculada a este producto prohíbe el uso de todo archivo o fragmento seleccionado de este producto. El uso por parte de terceros —lo que incluye, a título enunciativo, editoriales, profesores particulares, servicios de apoyo académico o ayuda para el estudio, colegios preparatorios, desarrolladores de aplicaciones y entidades que presten servicios de planificación curricular u ofrezcan recursos para docentes mediante plataformas digitales—, ya sea incluido en tasas o no, está prohibido y constituye un delito.

En este enlace encontrará más información sobre cómo solicitar una autorización por escrito en forma de licencia: <https://ibo.org/become-an-ib-school/ib-publishing/licensing/applying-for-a-license/>.

**Mathematics: applications and interpretation**  
**Standard level**  
**Paper 1**

15 May 2025

**Zone A** afternoon | **Zone B** afternoon | **Zone C** afternoon

Candidate session number

1 hour 30 minutes

--	--	--	--	--	--	--	--	--	--

**Instructions to candidates**

- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- A graphic display calculator is required for this paper.
- Answer all questions.
- Answers must be written within the answer boxes provided.
- Unless otherwise stated in the question, all numerical answers should be given exactly or correct to three significant figures.
- A clean copy of the **mathematics: applications and interpretation SL formula booklet** is required for this paper.
- The maximum mark for this examination paper is **[80 marks]**.



Answers must be written within the answer boxes provided. Full marks are not necessarily awarded for a correct answer with no working. Answers must be supported by working and/or explanations. Solutions found from a graphic display calculator should be supported by suitable working. For example, if graphs are used to find a solution, you should sketch these as part of your answer. Where an answer is incorrect, some marks may be given for a correct method, provided this is shown by written working. You are therefore advised to show all working.

1. [Maximum mark: 7]

**Give answers to this question correct to two decimal places.**

Pierre invests 1500 euros (EUR) at the end of each month for 10 years into a savings plan that pays a nominal annual interest rate of 3.6% compounded monthly.

(a) Calculate the value of Pierre's savings plan at the end of the 10 years. [3]

At the end of the 10 years, Pierre withdraws 100 000 EUR from the savings plan to use as a deposit on a house.

Pierre invests the remainder into another account for 15 years at a nominal annual interest rate of 4.5% compounded quarterly.

(b) Calculate the amount in Pierre's account at the end of this time. [4]

**(This question continues on the following page)**





2. [Maximum mark: 8]

Two unbiased dice, each with faces numbered from 1 to 6 inclusive, are rolled. The numbers on the uppermost faces of the dice are noted.

Let the random variable  $X$  be the difference between the numbers on the dice.

- (a) (i) Find  $P(X = 0)$ .
- (ii) Find  $P(X = 5)$ . [2]
- (b) Complete the table to show the probability distribution of  $X$ . [2]

The probability that  $X = 3$  is shown.

$x$	0	1	2	3	4	5
$P(X = x)$				$\frac{6}{36}$		

- (c) Calculate  $E(X)$ . [2]
- (d) Given that the difference between the numbers on the dice is an odd number, find the probability that  $X = 5$ . [2]

**(This question continues on the following page)**





Please **do not** write on this page.

Answers written on this page  
will not be marked.





4. [Maximum mark: 8]

Jane tested three different flavours of pet food on cats and dogs to determine whether the preferred flavour was independent of the type of animal.

The results are given in the table.

	Preferred flavour		
	Beef	Chicken	Fish
Cat	8	22	20
Dog	16	25	9

Perform a  $\chi^2$  test at both the 5% and 1% levels to investigate the results.

- (a) State the null and alternative hypotheses. [1]
- (b) Write down the number of degrees of freedom. [1]
- (c) Calculate the  $p$ -value for the test. [2]
- (d) State the conclusion to the test, giving your reason
  - (i) at the 1% level.
  - (ii) at the 5% level. [3]

Jane’s conclusion to her test was that the preferred flavour was not independent of the type of animal.

- (e) State which of the two significance levels Jane used in her test. [1]

**(This question continues on the following page)**





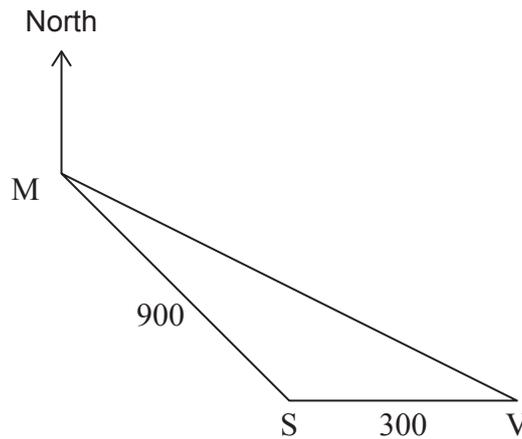
5. [Maximum mark: 8]

A ship sails 900 km on a bearing of  $135^\circ$  (south-east) from Lomé, M, to São Tomé, S, where she unloads her cargo.

The ship then sails 300 km due east from São Tomé to Libreville, V. From Libreville she then returns directly to Lomé.

These journeys are shown in the diagram.

diagram not to scale



- (a) Find the size of  $\widehat{VSM}$ . [1]
- (b) Calculate MV. [3]
- (c) Calculate the bearing of Lomé, M, from Libreville, V. [4]

(This question continues on the following page)





Please **do not** write on this page.

Answers written on this page  
will not be marked.



6. [Maximum mark: 6]

A speed camera is used to determine whether a car is exceeding a speed limit of  $8.3 \text{ m s}^{-1}$ .

An exact distance of 10m is marked out.

The car travels this 10m distance in 1.2 seconds, measured to the nearest 0.1 second.

Determine whether it is certain that the car was exceeding the speed limit of  $8.3 \text{ m s}^{-1}$ .

Justify your answer.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

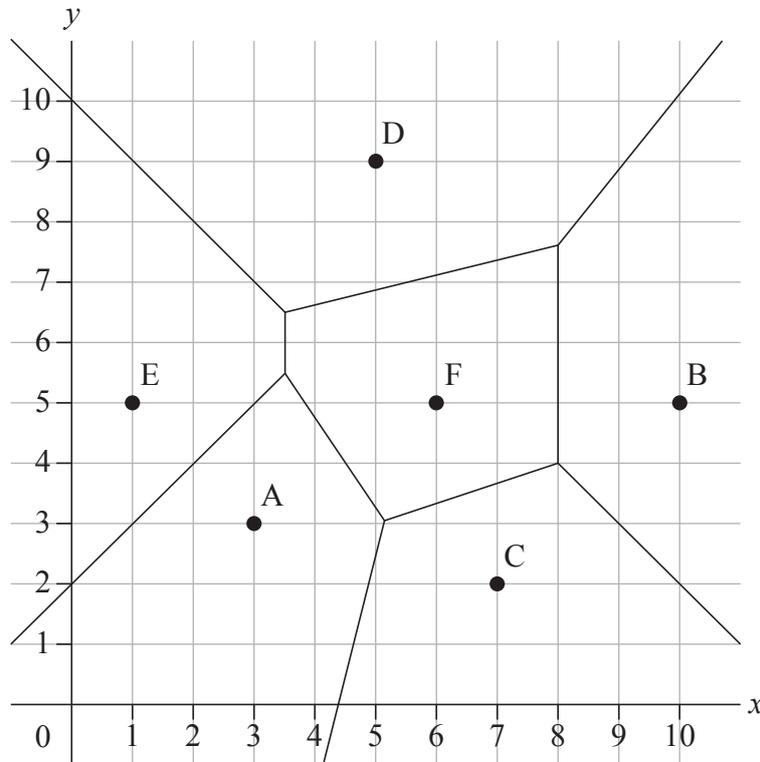
.....

.....



7. [Maximum mark: 9]

Consider the Voronoi diagram which shows the sites  $A(3, 3)$ ,  $B(10, 5)$ ,  $C(7, 2)$ ,  $D(5, 9)$ ,  $E(1, 5)$  and  $F(6, 5)$ . The diagram also shows the cells formed by each site and their boundaries.



(a) Find the equation of the boundary between sites D and E. [2]

Vertex X is equidistant from sites B, C and F.

(b) (i) Write down the coordinates of X.

(ii) The exact value of  $BX$  is  $\sqrt{n}$ . Write down the value of  $n$ . [2]

Vertex  $Y(a, b)$  is equidistant from sites B, D and F.

(c) (i) Write down the value of  $a$ .

(ii) Find the exact value of  $b$ . [5]

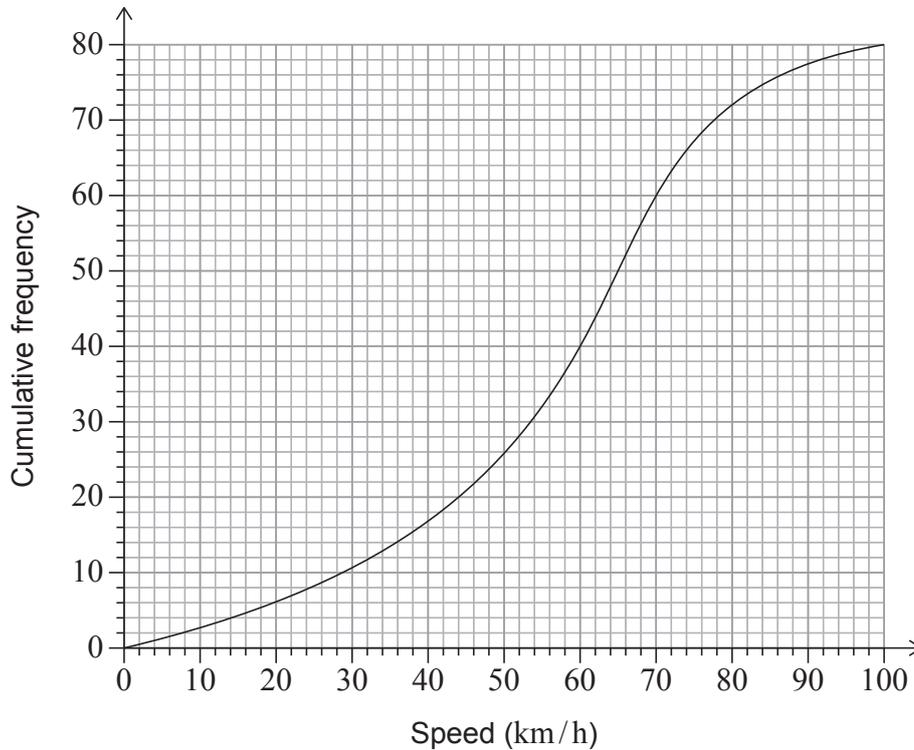
(This question continues on the following page)





8. [Maximum mark: 8]

The cumulative frequency curve shows the speeds in kilometres per hour of 80 cars along a road.



(a) Calculate the percentage of these cars that exceed the speed limit of 80 km/h. [2]

Consider the grouped frequency table constructed using the cumulative frequency curve.

Speed ( $x$ ) (km/h)	$0 < x \leq p$	$p < x \leq m$	$m < x \leq q$	$q < x \leq 100$
Number of cars	20	20	20	20

(b) Find the value of

(i)  $p$ .

(ii)  $m$ .

(iii)  $q$ .

[3]

(c) Hence calculate an estimate of the mean speed of these cars.

[3]

(This question continues on the following page)









11. [Maximum mark: 9]

The point A has coordinates (1, 2, 1) and the point B has coordinates (3, 5, 2).

(a) Find AB. [2]

Triangle ABC is right-angled with its right angle at B. The point C has coordinates (2, 8,  $k$ ).

(b) Find the value of  $k$ . [4]

(c) Calculate the size of  $\hat{BAC}$ . [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

