



Mathematics: applications and interpretation

Standard level

Paper 1

Sept 2024
Zone A afternoon | Zone B afternoon | Zone C afternoon

Candidate session number

1 hour 30 minutes

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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]**

Instructors : Nikolaos Sampanis – Nikolaos Tountas

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

Answers written on this page
will not be marked

Mathematics :applications and interpretation SL Paper 1 Sept 24

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: 6]

The prices, in euros (€), for all-day hiring of 12 beach lounges in Greek 12 islands, are :

49, 120, 115, 240, 78, α , 89, 95, 105, 93, 84, 102

The mean price of the beach loungers is 100€.

(a) Find the value of α

[2]

(b.i) Find the range of the prices.

[1]

(b.ii) Use your graphic display calculator to find the standard deviation of the prices.

[1]

In September, the price of each of the 12 beach lounges is reduced by 15 €.

(c) Write down

(i) the new mean.

(ii) the new standard deviation.

[2]

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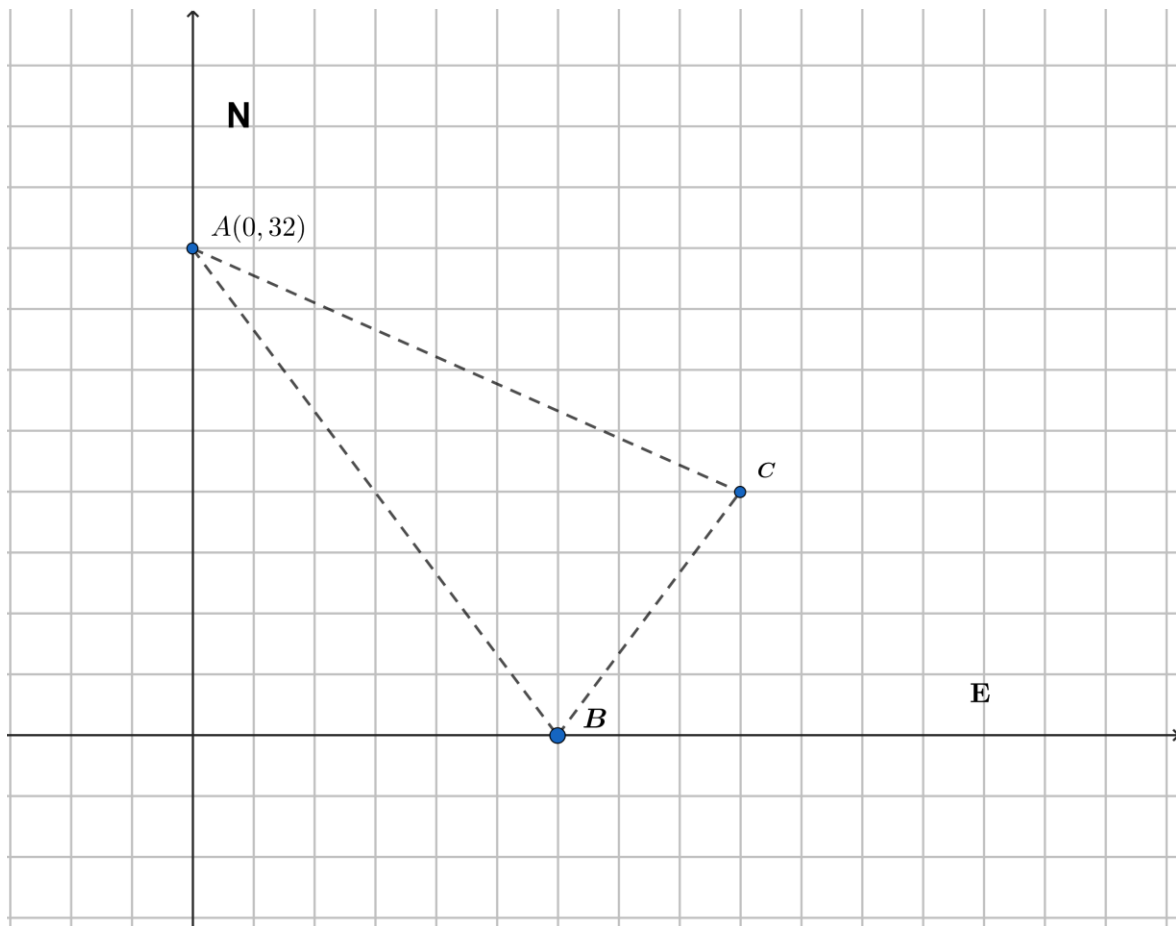
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3. [Maximum mark: 5]

The map shows the sites of three mobile antennas A, B and C.



- (a) Write down the coordinates of the antennas B and C. [2]
- (b) Patrick claims that the site A is equidistant from the sites B and C. Do you agree? Justify your answer. [3]

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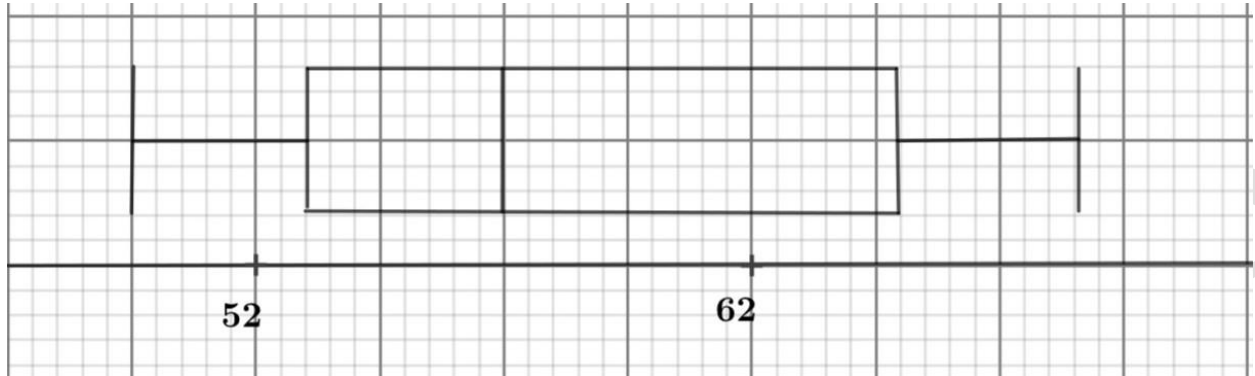
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4. [Maximum mark: 6]

The masses, in Kg, of 60 adult females were collected and summarized in the box and-whisker plot below.



- (a) Write down the median mass of the females. [1]
- (b) Calculate the interquartile range. [2]
- (c) Estimate the number of females who have a mass between 57 kg and 65 kg. [2]
- (d) Suzanna has a mass of 81 kg. Is this an outlier? Justify your answer. [1]

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5. [Maximum mark: 6]

The sum of the first n terms of an arithmetic sequence is given by

$$S_n = 3n + 4n^2$$

(a) Find the value of :

(i) S_1

(ii) S_2

[2]

Let α_n be the nth term of this arithmetic sequence.

(b) Show that $\alpha_2 = 15$

[1]

(c) Find the α_8

[1]

(d) Find the smallest possible value of n for which $\alpha_n > 205$

[2]

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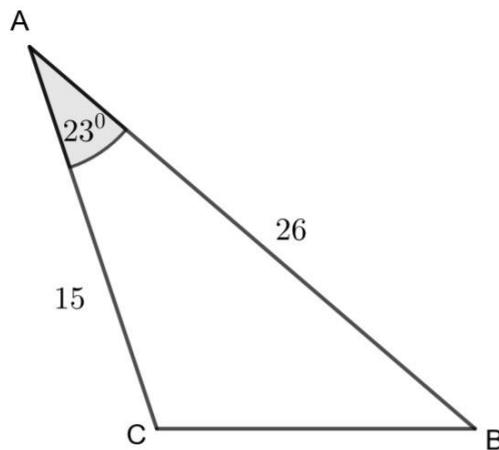
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8. [Maximum mark: 6]

The diagram shows an aeroplane wing.



$AB = 26\text{m}$, $AC = 15\text{ m}$ and $\hat{BAC} = 23^\circ$

- (a) Calculate BC [2]
- (b) Calculate the area ACB [2]
- (c) Find the construction cost if the material's cost is \$2500 per m^2 [2]

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10. [Maximum mark: 10]

John invests \$4500 in a bank that pays a nominal annual interest rate of 1.25%

(a) Calculate the amount of money John will have in the bank at the end of 5 years. Give your answer correct to two decimal places. [3]

(b) Calculate the number of months it takes until John has at least \$4850 in the bank. [2]

John uses the \$4850 as a partial payment for a new car costing \$25000. For the remainder he takes out a loan from a bank.

(c) Write down the amount of money that John takes out as a loan. [2]

The loan is for 10 years and the nominal annual interest rate is 14.3% compounded monthly. John will pay the loan in fixed monthly instalments at the end of each month.

(d) Calculate the amount, correct to the nearest dollar, that John will have to pay the bank each month. [3]

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