

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
TOTAL	



Certificate in Use of Mathematics  
Higher Level

# Use of Mathematics Core

# 43503H

## Specimen Question Paper

**For this paper you must have:**

- a clean copy of the Data Sheet (enclosed)
- a ruler
- a calculator.

**Time allowed**

- 1 hour 15 minutes

**Instructions**

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- You may **not** refer to the copy of the Data Sheet that was available prior to this examination. A clean copy is enclosed for your use.

**Information**

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 50.
- You are expected to use a calculator where appropriate.

**Advice**

- In all calculations, show clearly how you work out your answer.

**Section A**

Answer **all** questions in the spaces provided.

**Use Flights: London - Lisbon** on pages 2 and 3 of the Data Sheet.

**1 (a)** Write down the outward/return dates which will give the cheapest flights of those shown.

.....

*(1 mark)*

**1 (b) (i)** On the chosen day of travel, Liz wants to fly from London Heathrow (LHR) and does not want a flight taking off before 10 am.

What is the price of the cheapest outward flight taking off from Heathrow after 10 am?

.....

*(1 mark)*

**1 (b) (ii)** For this flight, calculate the length of time that this flight from London to Lisbon will take.

The time in Lisbon, Portugal is the same as the time in London.

.....

.....

*(2 marks)*

**1 (c)** If Liz had wanted to fly from London Gatwick, which flight would she have used?

.....

*(1 mark)*

**1 (d)** Ben buys a return ticket costing £140.30. He finds that this price includes taxes of £72.80.

Calculate the price paid for taxes as a percentage of the cost of his flight.

.....

.....

*(2 marks)*

1 (e) Chloe waits for a sale before buying her ticket. In the sale, all the prices are reduced by  $\frac{1}{6}$ .

Calculate the amount she is charged for a flight which normally costs £140.40 .

.....

.....

(3 marks)

10

**Section B**

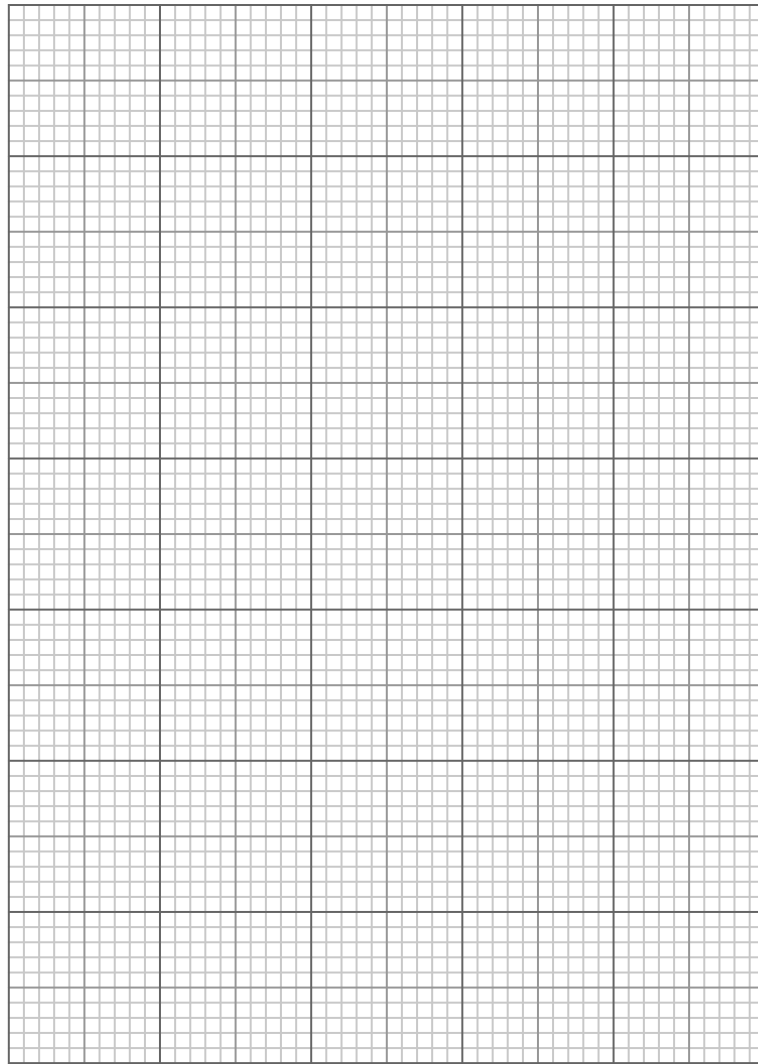
Answer **all** questions in the spaces provided.

Use **High definition televisions** on page 3 of the Data Sheet.

- 2 (a) (i)** Plot on the grid below the data pairs showing, for the screen heights given, the non-HD diagonal screen size and the HD diagonal screen size.

Draw the line of best fit through these points.

HD Television diagonal size (inches)



Non-HD Television diagonal size (inches)

(3 marks)

2 (a) (ii) Use your line of best fit to estimate the diagonal size of an HD television which has the same screen height as a non-HD television of size 37 inches.

.....  
(1 mark)

2 (b) (i) Find the difference in area between a 'non-HD' television and a HD television when both televisions have a diagonal size of 32 inches.

.....  
.....  
.....  
.....  
(4 marks)

2 (b) (ii) Find the decrease in area as a percentage of the area of the 'non-HD' screen size.

.....  
.....  
(2 marks)

2 (c) Sarah has a 'non-HD' television with a diagonal size of 32 inches. She wishes to buy a HD television, which has the same area.

Calculate the diagonal size which she needs to buy so that the area of the HD television is the same as the area of her 'non-HD' television.

.....  
.....  
.....  
.....  
.....  
.....  
(5 marks)

**Section C**

Answer **all** questions in the spaces provided.

Use **Chess grading** on page 5 of the Data Sheet.

**3 (a)** After 10 games in the ‘Match of the 20<sup>th</sup> Century’, Bobby Fischer’s results were as shown below.

**3 (a) (i)** Complete the table.

Played	Won	Drawn	Lost	Points
10	5	3	2	

(1 mark)

**3 (a) (ii)** Calculate Fischer’s percentage score.

.....

.....

(1 mark)

**3 (b)** The grades of two British Grandmasters in the 2008 grading list are as shown:

Michael Adams	272
Nigel Short	262

**3 (b) (i)** According to these grades, show that Adams might be expected to score 60 % in a match with Short.

.....

(1 mark)

**3 (b) (ii)** Describe two ways that a player could score 60 % in a match of 5 games.

.....

and.....

(2 marks)

**3 (c) (i)** In 2008, a player had an ‘old’ grade of 120.

What ‘new’ grade would correspond to this?

.....

.....

(1 mark)

**3 (c) (ii)** Another player has a 'new' grade of 131.

What 'old' grade would correspond to this?

.....  
 .....

(2 marks)

**3 (d)** A player notices that her 'new' grade is the same as her 'old' grade.

What is her grade?

.....  
 .....

(3 marks)

**3 (e)** The international chess federation is known as FIDE. A BCF grade can be converted to a FIDE grade using the equation

$$\text{FIDE grade} = \text{BCF grade} \times 8 + 650$$

What BCF grade would correspond to the FIDE grade of 2540 attained by Alexandra Kosteniuk?

.....  
 .....

(3 marks)

**Section D**

Answer **all** questions in the spaces provided.

Use **Silbury Hill** on page 6 of the Data Sheet.

**4 (a) (i)** What is the circumference around the base of Silbury Hill?

.....  
.....  
(2 marks)

**4 (a) (ii)** What is the distance in a straight line up the slope from the base of the hill to its top?

.....  
.....  
(2 marks)

**4 (b) (i)** Use the formula

$$V = \frac{1}{3}\pi r^2 h$$

to calculate the volume of Silbury Hill.

.....  
.....  
(2 marks)

**4 (b) (ii)** Why is your answer to part **(a)** greater than the 250 000 m<sup>3</sup> given on the data sheet?

.....  
.....  
(2 marks)

**4 (c)** You may assume that approximately 500 men worked on Silbury Hill during each day that it was being constructed.

Estimate how many years that it took to construct the hill.

.....  
.....  
(3 marks)

**END OF QUESTIONS**