

Please check the examination details below before entering your candidate information

Candidate surname					Other names				
Centre Number					Candidate Number				

Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Aiming for Grade 8

Paper reference	1MA1/3H
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Mathematics

PAPER 3 (Calculator)

Higher Tier

37 marks 40 minutes



You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator, Formulae Sheet (enclosed). Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.

Information

- The total mark for this paper is 37. There are 11 questions.
- Questions have been broadly arranged in an ascending order of mean difficulty, as found by students achieving Grade 8 in the Summer and November 2023 examinations.
- Questions marked with an asterisk (*) also appear on the Higher Tier paper.
- 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer all questions.

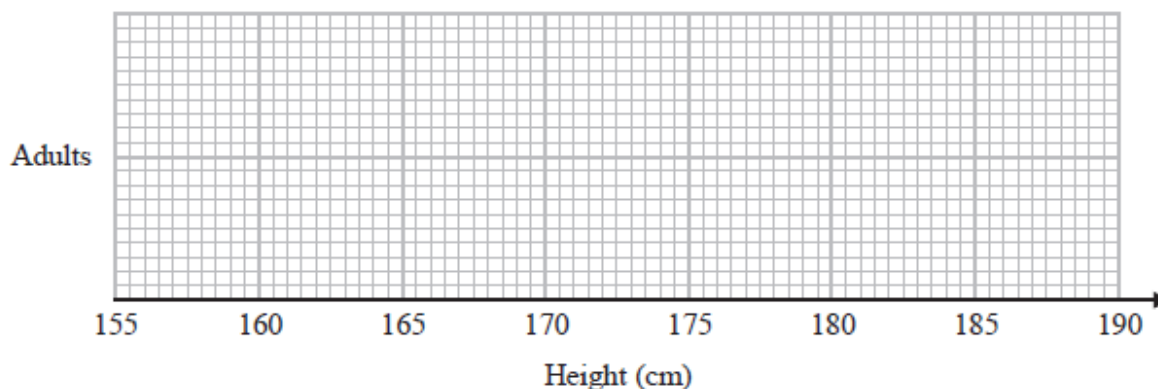
Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1** The table shows some information about the heights of a group of adults.

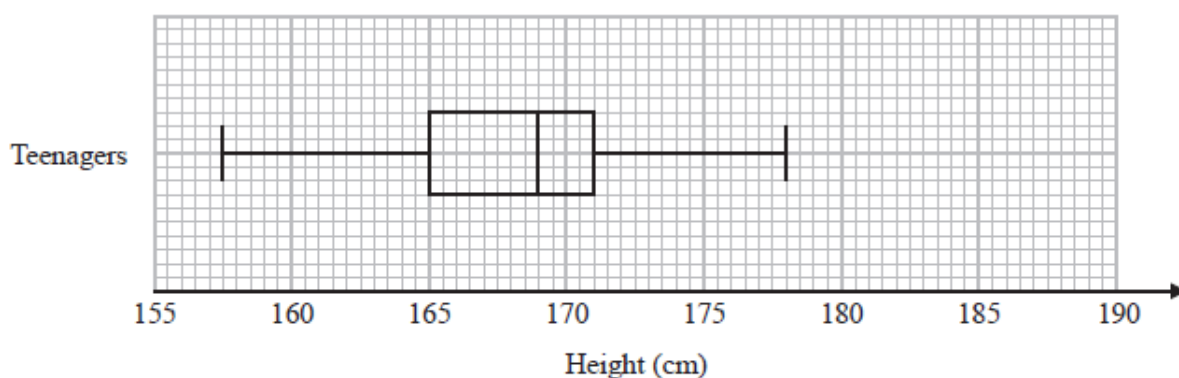
least height	169 cm
greatest height	186 cm
median	177 cm
lower quartile	174 cm
upper quartile	180 cm

- (a) On the grid, draw a box plot for the information in the table.



(3)

The box plot below shows the distribution of the heights of a group of teenagers.



- (b) Compare the distribution of the heights of the adults with the distribution of the heights of the teenagers.

.....

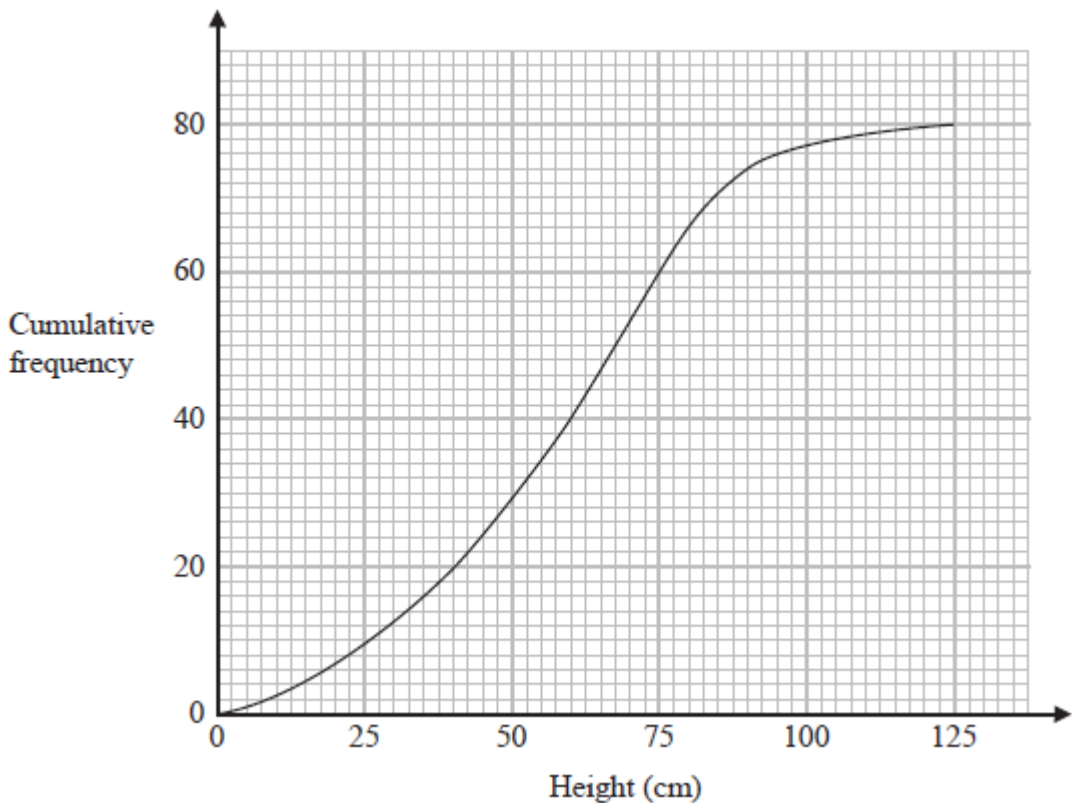
.....

(2)

(Total for Question 1 is 5 marks)

2 Alan grew 80 plants of the same type outside.

The cumulative frequency graph shows information about the heights, in cm, of these plants.



One of the plants is chosen at random.

(a) Find an estimate for the probability that this plant will have a height greater than 90 cm.

.....
(2)

(b) Use the graph to find an estimate for the interquartile range of the heights.

..... cm
(2)

Alan also grew plants of the same type inside.

The interquartile range of the heights of these plants is 30 cm.

(c) Give one comparison between the distribution of the heights of the plants grown inside with the distribution of the heights of the plants grown outside.

.....
.....

(1)

(Total for Question 2 is 5 marks)

***3** Seija works at a weather station.

The table gives information about the temperature, T °C, at midday for each of 50 cities in the UK on Tuesday.

Temperature (T °C)	Frequency
$10 < T \leq 15$	2
$15 < T \leq 20$	8
$20 < T \leq 25$	13
$25 < T \leq 30$	21
$30 < T \leq 35$	6

Seija says,
“The median temperature is 22.5 °C because 22.5 is the middle number in the middle group.”

Is Seija correct? Give a reason for your answer.

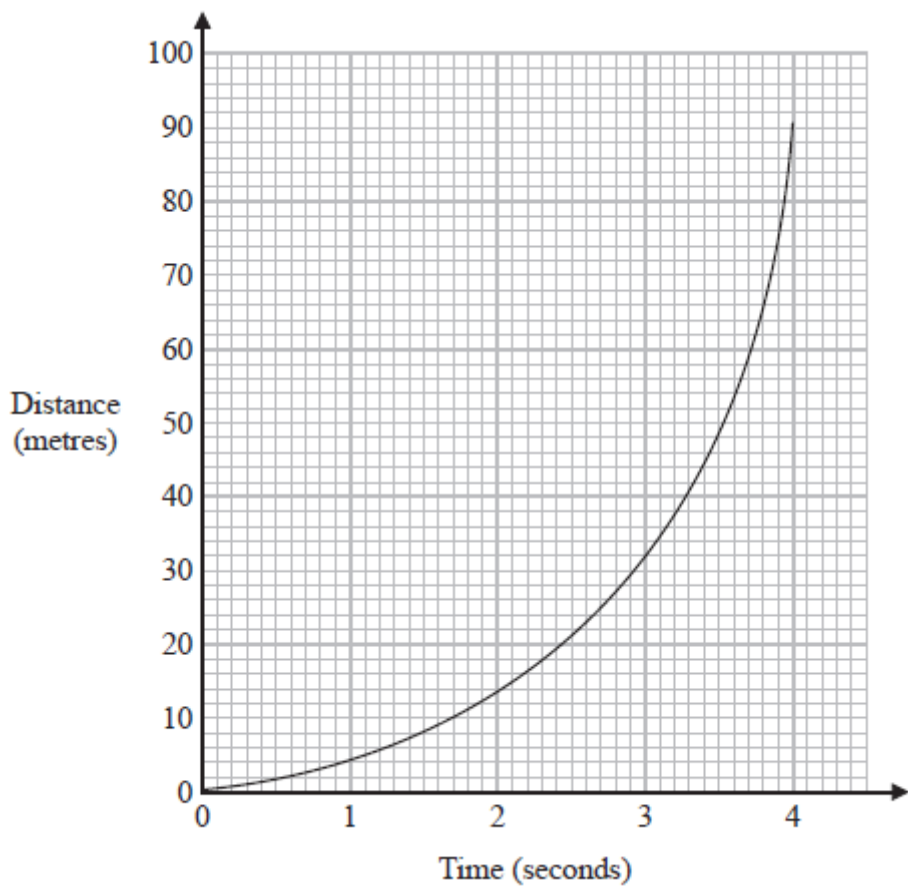
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(Total for Question 3 is 1 mark)

4 Here is a distance-time graph.



What does the gradient of the graph represent?

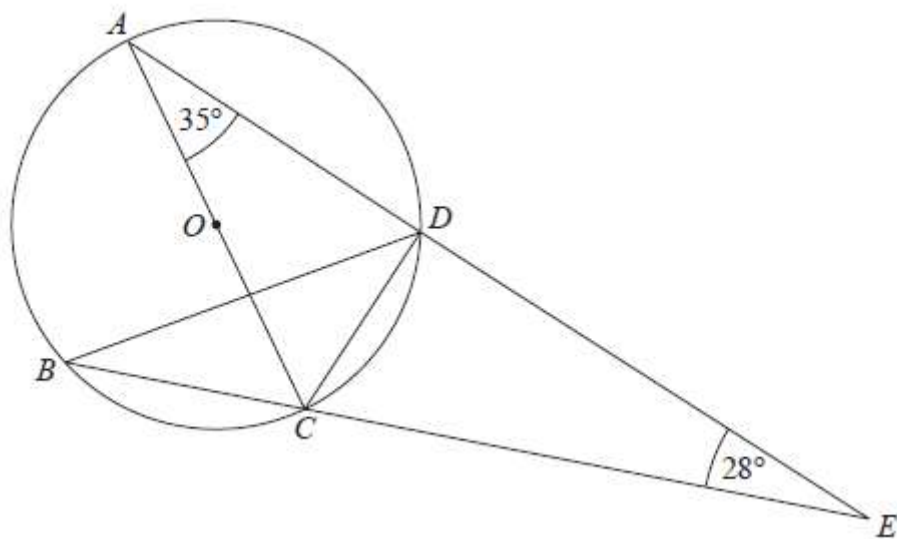
.....

.....

(Total for Question 4 is 1 mark)

5 Solve $\frac{1}{x+4} + \frac{3}{2-2x} = 1$

.....
(Total for Question 5 is 4 marks)



A , B , C and D are points on the circumference of a circle, centre O .
 AC is a diameter of the circle.
 ADE and BCE are straight lines.
Work out the size of angle BDC .
Write down any circle theorems that you use.

.....^o
(Total for Question 6 is 4 marks)

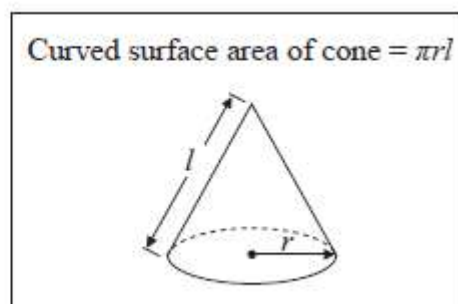
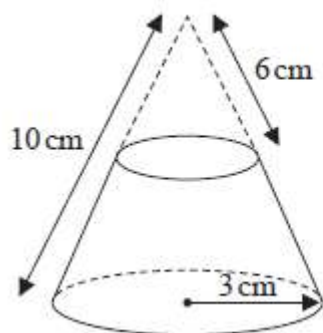
- 7 Given that $\frac{2x^2 + y^2}{4x^2 - y^2} = \frac{43}{11}$ where $x > 0$ and $y > 0$
find, in its simplest form, the ratio $x : y$

.....
(Total for Question 7 is 4 marks)

- 8 The turning point on the graph of $y = g(x)$ has coordinates $(-3, 6)$
Write down the coordinates of the turning point on the graph of $y = g(x - 7)$

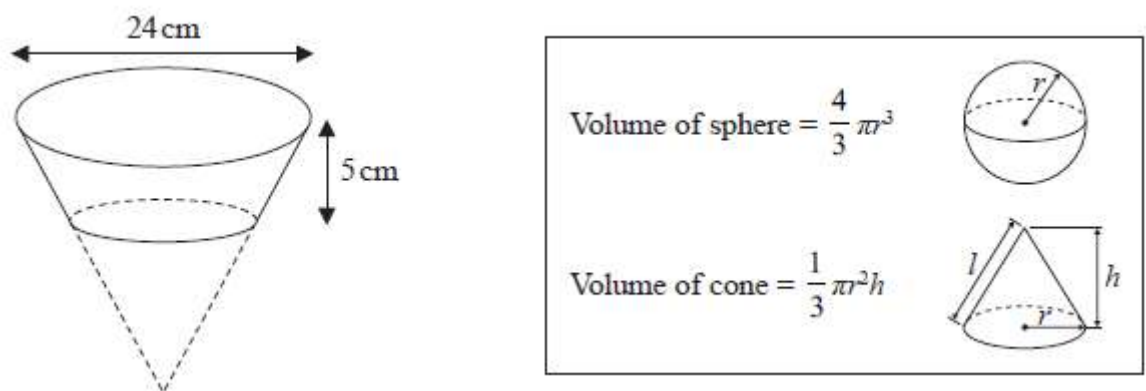
(..... ,)
(Total for Question 8 is 1 mark)

- 9 A solid frustum is made by removing a small cone from a large cone as shown in the diagram.



The slant height of the small cone is 6 cm.
 The slant height of the large cone is 10 cm.
 The radius of the base of the large cone is 3 cm.
 Calculate the total surface area of the frustum.
 Give your answer correct to 3 significant figures.

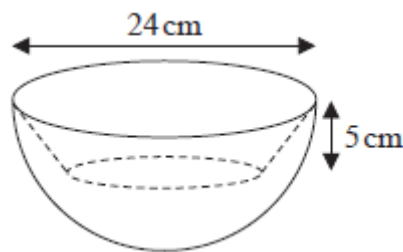
..... cm²
 (Total for Question 9 is 5 marks)



The diagram above shows a frustum **F** of a cone.

The frustum is made by removing a cone with height 10 cm from a solid cone with height 15 cm and base diameter 24 cm.

The solid **S** is made by removing **F** from a solid hemisphere as shown in the diagram below.



The hemisphere has diameter 24 cm.

Calculate the volume of solid **S**.

Give your answer correct to 3 significant figures.

..... cm³
(Total for Question 10 is 4 marks)

11 Zia has to set a 4-digit security passcode on her phone.

Each digit of the passcode is a number from 1 to 9

She can use each number more than once.

Zia tells her friend Amber that

the first digit is a cube number

the second digit is a prime number

the third digit is greater than 6

the fourth digit is an odd number.

The diagram shows one possible 4-digit passcode.



Amber is going to have one attempt at guessing Zia's passcode.

Work out the probability that Amber guesses Zia's passcode on the first attempt.

.....
(Total for Question 11 is 3 marks)

TOTAL FOR PAPER IS 37 MARKS