

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

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Forename(s)

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Candidate signature

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## Level 3 Certificate MATHEMATICAL STUDIES

### Paper 1

Wednesday 18 May 2016

Morning

Time allowed: 1 hour 30 minutes

#### Materials

For this paper you must have:

- a clean copy of the Preliminary Material and formulae sheet (enclosed)
- a scientific calculator or a graphics calculator
- a ruler.

#### 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 questions in the space provided. Do not write outside the box around each page or on blank pages.
- Show all necessary working; otherwise, marks for method may be lost.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- The **final** answer to questions should be given to an appropriate degree of accuracy.
- You may **not** refer to the copy of the Preliminary Material 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 60.
- You may ask for more answer or graph paper, which must be tagged securely to this answer booklet.
- The paper reference for this paper is 1350/1.



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

**1** A maths exam has two papers.

This table shows the percentage marks for 19 students for Paper 2 of the exam.

Student	A	B	C	D	E	F	G	H	I	J
Paper 2 mark	65	80	65	84	70	82	71	75	51	70

Student	K	L	M	N	O	P	Q	R	S
Paper 2 mark	50	81	90	57	76	99	67	81	92

**1 (a)** Circle the words that describe this type of data.

**[2 marks]**

discrete

qualitative

continuous

quantitative

**1 (b)** The table below shows information about the percentage marks for the same 19 students on Paper 1

	Lowest value	Lower quartile	Median	Upper quartile	Highest value
Paper 1	45	70	73	83	90
Paper 2					

**[4 marks]**

Complete this table to show the information for Paper 2

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2

In an enterprise project Anish buys sweatshirts for £22.50 each.  
He has to decide what price,  $P$ , he wants to put on each sweatshirt.  
If he doesn't sell them all, he will reduce this price,  $P$ , by 10%  
He still wants to make 20% profit on the cost of each reduced-price sweatshirt.  
What should the price,  $P$ , be for each sweatshirt?

**[3 marks]**

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Answer £ \_\_\_\_\_

3



**4** There are 85 girls and 65 boys in Year 12 of a school.

A sample of students is to be taken.

**4 (a)** The headteacher decides to choose a sample stratified by gender.

Is this a suitable sampling method to use?

Give reasons for your answer.

**[2 marks]**

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**4 (b)** There will be 34 girls in the sample.

Describe how random numbers could be used to select a sample of the 34 girls.

**[3 marks]**

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**4 (c)** For a different sample, the headteacher decides to choose all the girls in the two tutor groups closest to her office.

What type of sampling method is this?

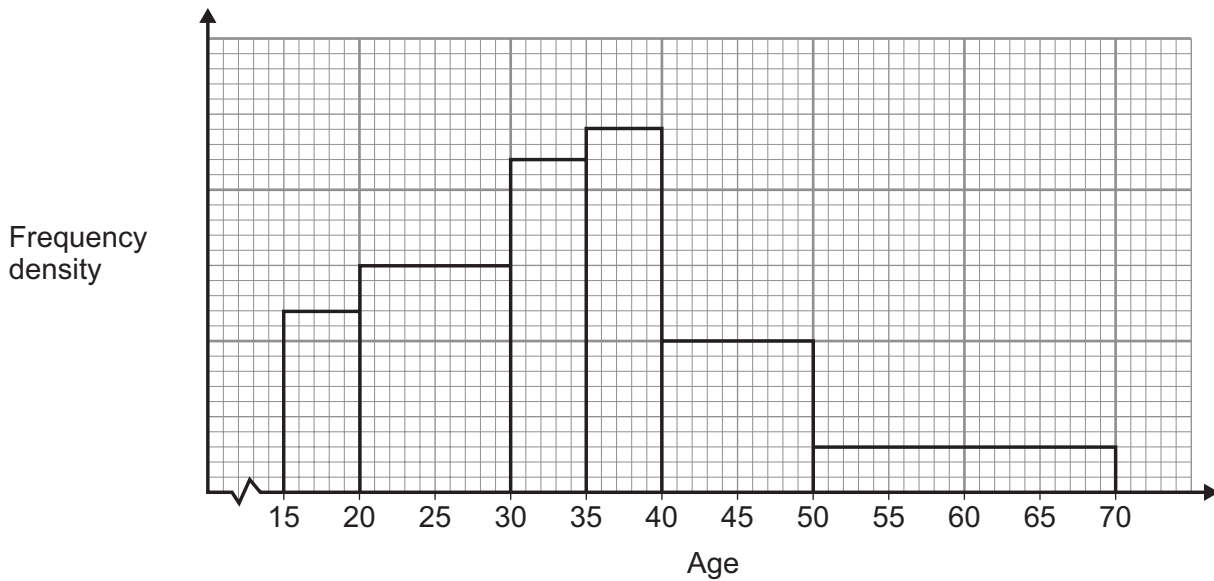
**[1 mark]**

Answer \_\_\_\_\_



[illegible]

- 7 The histogram shows the distribution of the ages of members of a gym.  
The members are all aged 15 or over but less than 70



There are 600 gym members in total.  
The bar between 20 and 30 represents the 150 members aged 20 or over but less than 30

The table shows the monthly membership fees for different age groups.

Age	Monthly fee
Less than 21	£9
21 to 64	£12
65 and over	£9

Estimate the total amount of membership fees paid per month.

**[4 marks]**

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Answer £ \_\_\_\_\_

4

Turn over ►



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# Level 3 Certificate MATHEMATICAL STUDIES

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## Formulae Sheet

### **Information**

This formulae sheet should be issued to all candidates for use with all Mathematical Studies examinations.

These formulae are not required to be learnt. A clean copy of this formulae sheet will be issued to you in the examination.

### Volume and surface area

Shape	Volume	Surface area
Cone	$V = \frac{1}{3} \pi r^2 h$	$A = \pi r l + \pi r^2$
Sphere	$V = \frac{4}{3} \pi r^3$	$A = 4\pi r^2$
Pyramid	$V = \frac{1}{3} \text{ base} \times h$	

### Financial calculation – AER

The annual equivalent interest rate (AER),  $r$ , is given by

$$r = \left(1 + \frac{i}{n}\right)^n - 1$$

where  $i$  is the nominal interest rate, and  $n$  is the number of compounding periods per year.

Note: the values of  $i$  and  $r$  should be expressed as decimals.

### Financial calculation – APR

The annual percentage interest rate (APR) is given by

$$C = \sum_{k=1}^m \left( \frac{A_k}{(1+i)^{t_k}} \right)$$

where  $\pounds C$  is the amount of the loan,  $m$  is the number of repayments,  $i$  is the APR expressed as a decimal,  $\pounds A_k$  is the amount of the  $k$ th repayment,  $t_k$  is the interval in years between the start of the loan and the  $k$ th repayment.

It may be assumed that there are no arrangement or exit fees.

## END OF FORMULAE SHEET

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# Level 3 Certificate MATHEMATICAL STUDIES

June 2016

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## Preliminary Material

To be opened and issued to candidates on  
Tuesday 1 March 2016

### REMINDER TO CANDIDATES

YOU MUST **NOT** BRING THIS PRELIMINARY MATERIAL  
WITH YOU WHEN YOU SIT THE EXAMINATION.  
A CLEAN COPY WILL BE MADE AVAILABLE.

### INFORMATION

The Preliminary Material is to be seen by teachers and candidates **only**, for use during preparation for the examination on Wednesday 18 May 2016. It **cannot** be used by anyone else for any other purpose, other than as stated in the instructions issued, until after the examination date has passed. It must **not** be provided to third parties.

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## Income Tax and National Insurance 2015–2016

### Income tax 2015–2016

Everyone in the UK has a personal allowance. This is their annual amount of tax-free income. The standard personal allowance for 2015–2016 was £10 600

The rates of income tax you pay depend on how much **taxable income** you have above your personal allowance.

### Income tax rates and taxable bands 2015–2016

Rate	Taxable Income
Basic: 20%	£0–£31 785
Higher: 40%	£31 786–£150 000
Additional: 45%	Over £150 000

### To calculate your income tax if your annual income is £100 000 or less

Find your taxable income by subtracting your personal tax allowance from your annual gross income.

You pay income tax at 20% on the first £31 785 of your taxable income.

You pay income tax at 40% on your taxable income over £31 785

## National Insurance (NI) 2015–2016

Percentage NI Due	Minimum Weekly Income	Maximum Weekly Income	Minimum Monthly Income	Maximum Monthly Income	Minimum Yearly Income	Maximum Yearly Income
Nil		below £112		below £486		below £5832
0%	£112	£155	£486	£672	£5832	£8064
12%	£155.01	£815	£672.01	£3532	£8064.01	£42 385
2%	above £815		above £3532		above £42 385	

### Examples

A person who had a weekly income of £350 a week paid 12% on the amount above £155

A person who had a weekly income of £950 paid 12% on the amount between £155.01 and £815 plus 2% of the amount above £815

### Gross pay

Your gross pay is your wage or salary before any deductions are made.

### Net pay

Your net pay (or take-home pay) is the amount of money you receive after income tax, National Insurance and other deductions have been taken off your gross pay.

Turn over ►

## Student Loans

The Student Loans Company (SLC) gives loans to students at university.

There are two types of repayment plan for student loans.

If you started your course before 1 September 2012 you will be on **repayment plan 1**

If you started your course on or after 1 September 2012 you will be on **repayment plan 2**

### Repayment plan 1

You only start making repayments when your gross income is over the threshold of £17 335 a year.

You pay 9% of anything you earn over the threshold.

### Repayment plan 2

You only start making repayments when your gross income is over the threshold of £21 000 a year.

You pay 9% of anything you earn over the threshold.

For either plan you can also make additional voluntary repayments to SLC at any time which will reduce your balance earlier.