Write your name here

| Surname | Other names |
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**Edexcel GCSE**

| Centre Number | Candidate Number |
|---|---|
| | |

# Mathematics B

## Unit 1: Statistics and Probability (Calculator)

**Higher Tier**

| Thursday 28 February 2013 – Afternoon<br>**Time: 1 hour 15 minutes** | Paper Reference<br>**5MB1H/01** |
|---|---|

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. 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.*
- **Calculators may be used.**
- If your calculator does not have a $\pi$ button, take the value of $\pi$ to be 3.142 unless the question instructs otherwise.



### Information

- The total mark for this paper is 60
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

### 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.

*Turn over* ▶

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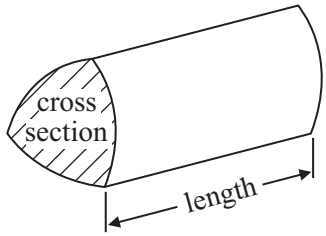
PEARSON

**GCSE Mathematics 2MB01**

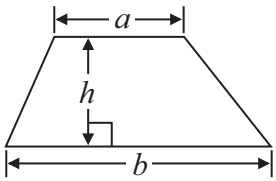
Formulae: Higher Tier

**You must not write on this formulae page.**
**Anything you write on this formulae page will gain NO credit.**

**Volume of prism** = area of cross section × length

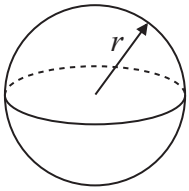



**Area of trapezium** = $\frac{1}{2}(a + b)h$



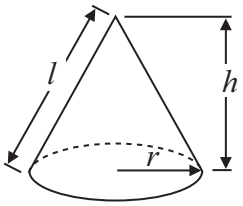

**Volume of sphere** = $\frac{4}{3}\pi r^3$

**Surface area of sphere** = $4\pi r^2$

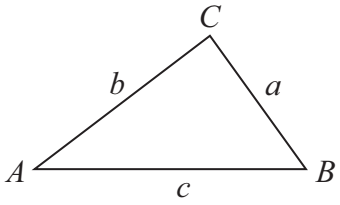



**Volume of cone** = $\frac{1}{3}\pi r^2 h$

**Curved surface area of cone** = $\pi rl$




**In any triangle *ABC***




**The Quadratic Equation**
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

**Sine Rule** $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule** $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** = $\frac{1}{2}ab \sin C$

**Answer ALL questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**1** Keith and Graham share £105 in the ratio 4 : 3

Work out how much Keith gets.

£.....

**(Total for Question 1 is 2 marks)**

**2** The probability that a pea plant will grow from a seed is 93%.

Sarah plants 800 seeds.

Work out an estimate for the number of seeds that will grow into pea plants.

.....

**(Total for Question 2 is 2 marks)**

**3** The manager of a sports centre is planning a new cycle track.
The manager wants to know if many people will use the cycle track.

The manager uses this question on a questionnaire.

How often would you use the cycle track?

☐ A lot ☐ Quite a lot ☐ Not very often

(a) Write down **two** things wrong with this question.

1 .....

.....

2 .....

.....

**(2)**

(b) Design a better question to find out how often people would use the cycle track.

**(2)**

The manager plans to give the questionnaire to the first 20 people who get to the sports centre on Tuesday morning.

(c) Give two reasons why this may **not** be a suitable sample.

Reason 1 .....

.....

Reason 2 .....

.....

**(2)**

**(Total for Question 3 is 6 marks)**

**4** There are 40 children in a ski club.
Each child has one pair of skis.

The skis are

twin tipped skis
or downhill skis
or slalom skis.

There are 23 boys in the ski club.
7 of the boys have twin tipped skis.
8 of the girls have downhill skis.
5 of the 9 children with slalom skis are girls.

Work out the number of children with twin tipped skis.

.....

**(Total for Question 4 is 4 marks)**

***5** Mr and Mrs Jennings are planning a holiday to Italy.

They will go on holiday with their 11 year old daughter.

The table below shows some information about the prices of flights.

| **Flight to Italy** | | **Flight back from Italy** | |
|---|---|---|---|
| **Date** | **Price per adult (£)** | **Date** | **Price per adult (£)** |
| 28th October | 282 | 4th November | 305 |
| 29th October | 283 | 5th November | 303 |
| 30th October | 282 | 6th November | 285 |
| 31st October | 272 | 7th November | 283 |
| **Child fares** | | | |
| 0 to 2 years old | | No charge | |
| Over 2 to 12 years old | | 75% of the adult fare | |

Mr and Mrs Jennings and their daughter want to fly to Italy on 29th October.
They want to fly back from Italy on 6th November.

They have £1600 to spend on flights.
Do they have enough money for the flights?

You must show all your working.

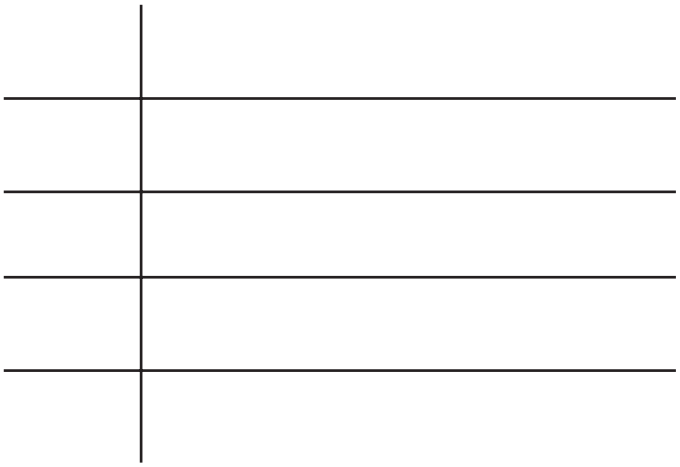
**(Total for Question 5 is 6 marks)**

**6** Here are the lengths, in cm, of 18 different model boats.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 47 | 58 | 64 | 27 | 42 | 58 | 29 | 34 | 56 |
| 66 | 53 | 26 | 30 | 63 | 47 | 57 | 42 | 44 |

Draw an ordered stem and leaf diagram to show this information.

You must include a key.



Key:

**(Total for Question 6 is 3 marks)**

**7** A piece of wood has a length of 65 centimetres to the nearest centimetre.

(a) What is the least possible length of the piece of wood?

.....cm

**(1)**

(b) What is the greatest possible length of the piece of wood?

.....cm

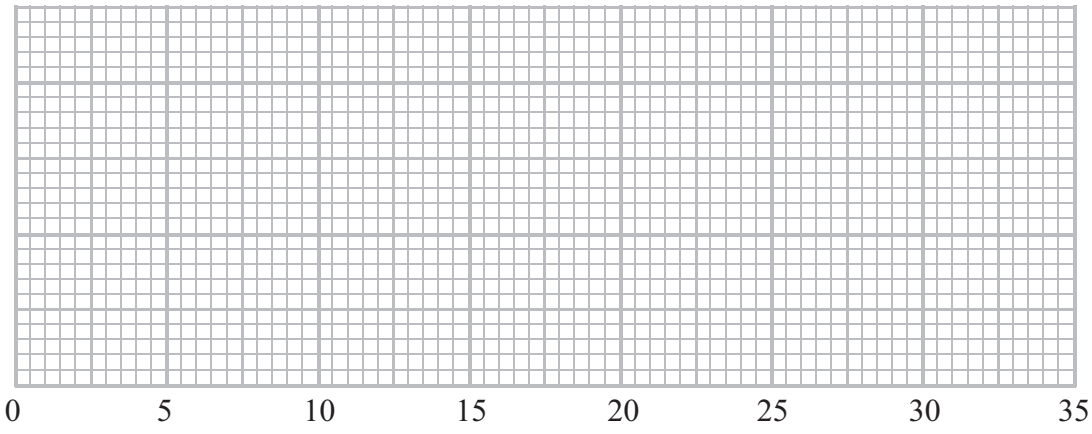
**(1)**

**(Total for Question 7 is 2 marks)**

**8** The table below shows information about the times, in minutes, a group of students took to answer 10 maths questions.

| | **Least** | **Lower quartile** | **Median** | **Upper quartile** | **Greatest** |
|---|---|---|---|---|---|
| Time in minutes | 14 | 18 | 20 | 25 | 30 |

On the grid below, draw a box plot to show the information in the table.




**(Total for Question 8 is 3 marks)**

***9** There are two trays of plants in a greenhouse.
The first tray of plants was given fertiliser.
The second tray of plants was not given fertiliser.

On Monday the heights of the plants were measured in centimetres.
The boxes show some information about the heights of the plants.

**Heights of the plants given fertiliser**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 22 | 29 | 30 | 35 | 37 | 40 | 44 | 47 |
| 48 | 48 | 54 | 56 | 59 | 66 | 72 | |

**Information about the heights of plants not given fertiliser**

| | | | |
|---|---|---|---|
| Smallest | 18 | Lower quartile | 26 |
| Largest | 64 | Upper quartile | 47 |
| Median | 44 | | |

Compare the distribution of the heights of the plants given fertiliser to the distribution of the heights of the plants not given fertiliser.

**(Total for Question 9 is 4 marks)**

**10** The table shows information about the ages of 90 employees in a factory.

| Age ($a$ years) | Frequency |
|---|---|
| $15 < a \leqslant 25$ | 12 |
| $25 < a \leqslant 35$ | 27 |
| $35 < a \leqslant 45$ | 18 |
| $45 < a \leqslant 55$ | 23 |
| $55 < a \leqslant 65$ | 10 |

(a) Calculate an estimate for the mean age.

.....years

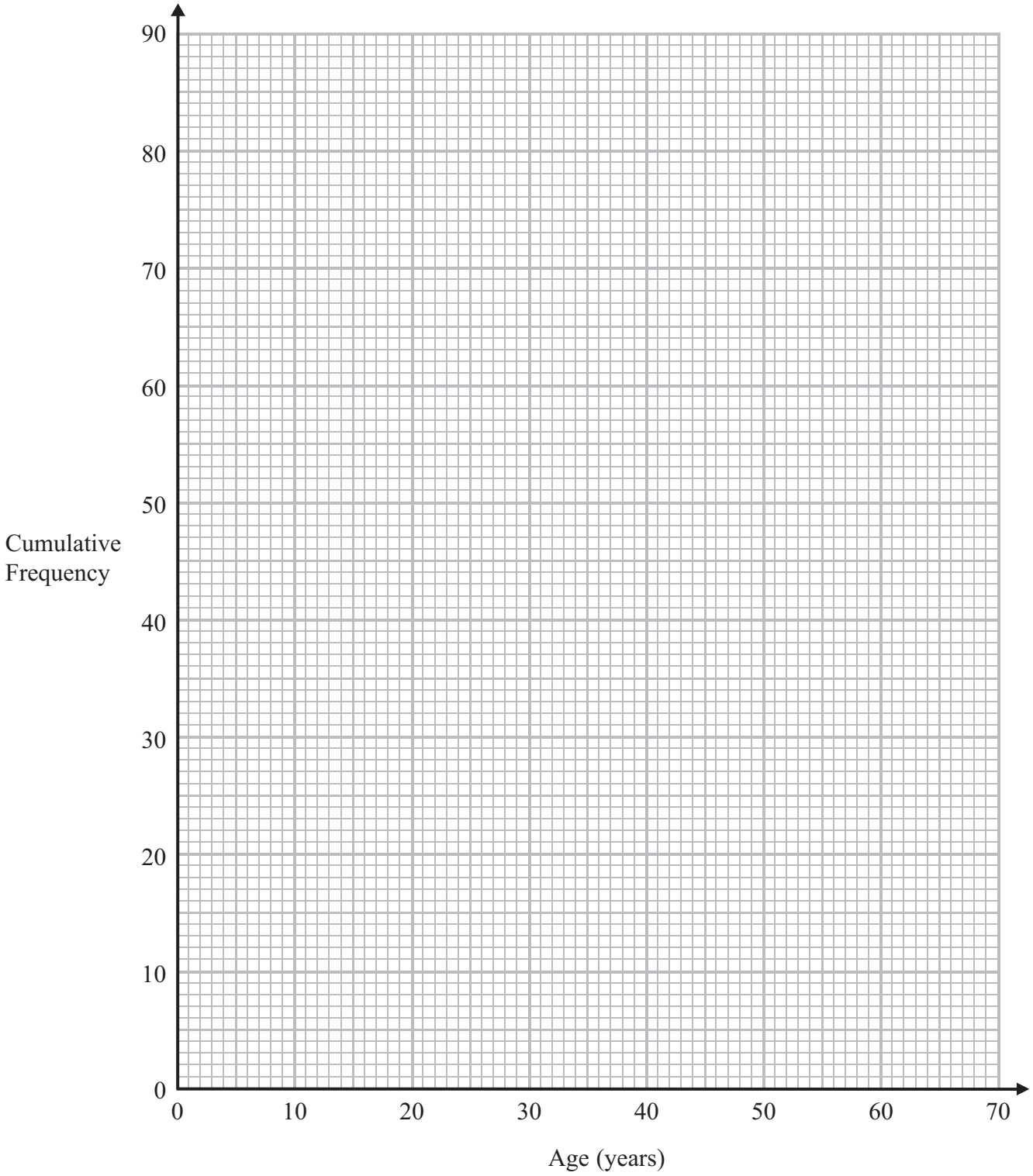
**(4)**

(b) Complete the cumulative frequency table.

| Age ($a$ years) | Cumulative Frequency |
|---|---|
| $15 < a \leqslant 25$ | |
| $15 < a \leqslant 35$ | |
| $15 < a \leqslant 45$ | |
| $15 < a \leqslant 55$ | |
| $15 < a \leqslant 65$ | |

**(1)**

(c) On the grid, draw a cumulative frequency graph for your table.




**(2)**

(d) Find an estimate for

(i) the median age,

.....years

(ii) the number of the employees over the age of 50

.....

**(3)**

**(Total for Question 10 is 10 marks)**

**11** Martin bought a computer for £1200
At the end of each year the value of the computer is depreciated by 20%.

After how many years will the value of the computer be £491.52?
You must show your working.

.....

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

**12** The table shows the number of students in each year group at a college.

| Year group | Number of students |
|---|---|
| 1 | 182 |
| 2 | 140 |
| 3 | 98 |
| Total | 420 |

The college secretary took a stratified sample of 135 students, by year group.

Work out the number of year 2 students in her sample.

.....

**(Total for Question 12 is 2 marks)**

**13** The table shows some information about the weights of oranges.

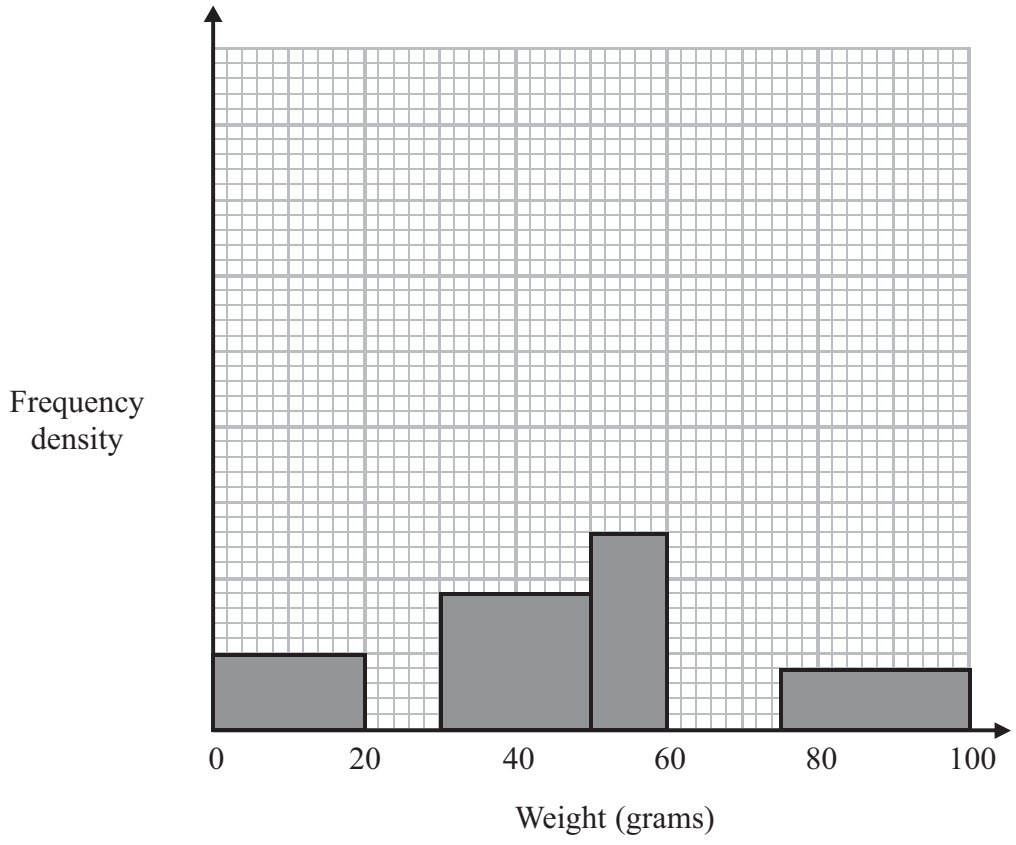
| Weight ($w$ grams) | Frequency |
|---|---|
| $0 < w \leqslant 20$ | |
| $20 < w \leqslant 30$ | 15 |
| $30 < w \leqslant 50$ | |
| $50 < w \leqslant 60$ | 13 |
| $60 < w \leqslant 75$ | 15 |
| $75 < w \leqslant 100$ | 10 |

(a) Use the histogram to complete the table.

**(2)**

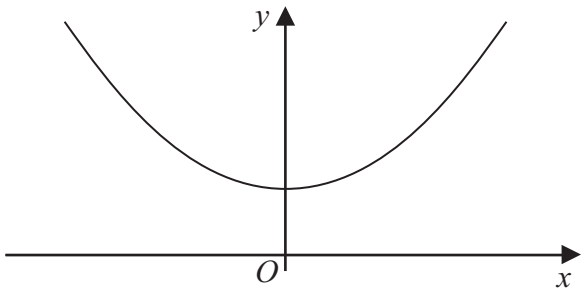
(b) Use the table to complete the histogram.

**(2)**

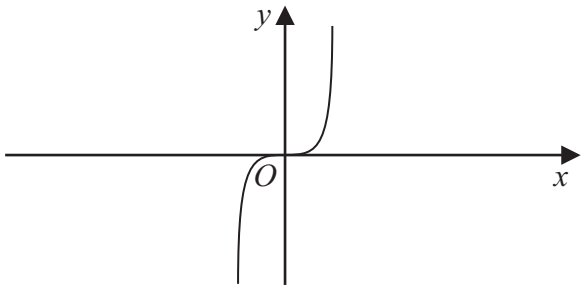



**(Total for Question 13 is 4 marks)**

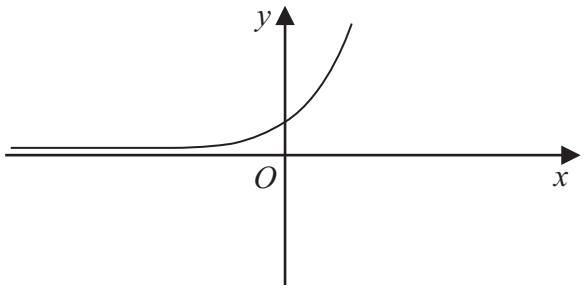
**14** Here are three graphs.




**A**




**B**




**C**

Here are four equations of graphs.

$y = x^3$ $\quad$ $y = x^2 + 4$ $\quad$ $y = \dfrac{1}{x}$ $\quad$ $y = 2^x$

Match each to the correct equation.

**A** and $y =$ .....

**B** and $y =$ .....

**C** and $y =$ .....

**(Total for Question 14 is 3 marks)**

**15** Lily and Anna take a test.

The probability that Lily will pass the test is 0.6

The probability that Anna will pass the test is 0.8

(a) Work out the probability that both of these girls fail the test.

.....

**(3)**

(b) Work out the probability that both of these girls pass the test or that both of these girls fail the test.

.....

**(3)**

**(Total for Question 15 is 6 marks)**

**TOTAL FOR PAPER IS 60 MARKS**

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