Surname	Centre Number	Candidate Number
First name(s)		0

GCSE

3310U30-1

S23-3310U30-1

FRIDAY, 19 MAY 2023 – MORNING

MATHEMATICS – NUMERACY
UNIT 1: NON-CALCULATOR
INTERMEDIATE TIER

1 hour 45 minutes

ADDITIONAL MATERIALS

The use of a calculator is not permitted in this examination.

A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

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

If you run out of space, use the additional page at the back of the booklet. Question numbers must be given for the work written on the additional page.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

In question **1**, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**5**	
2.	**8**	
3.	**6**	
4.	**5**	
5.	**5**	
6.	**3**	
7.	**6**	
8.	**7**	
9.	**11**	
10.	**10**	
11.	**4**	
12.	**3**	
13.	**7**	
Total	**80**	

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01

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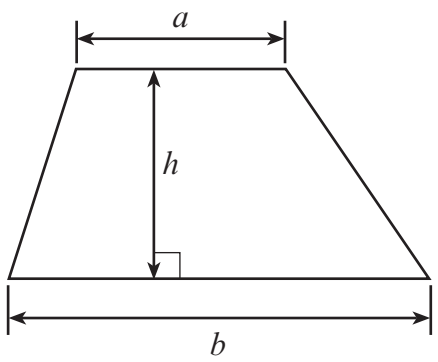
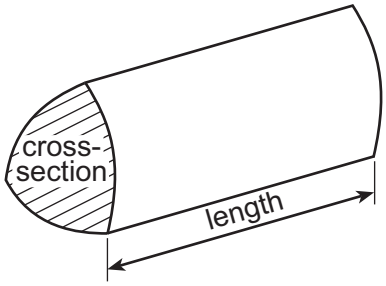
Formula List – Intermediate Tier

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



Volume of prism = area of cross-section × length



Examiner only

1. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

Small bottle
30 ml for £1.20

Medium bottle
40 ml for £1.56

Large bottle
50 ml for £2.25

Katelyn is buying some medicine.
Which size bottle of medicine offers the best value for money?
You must show all your working. [3 + 2 OCW]

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03

Turn over.

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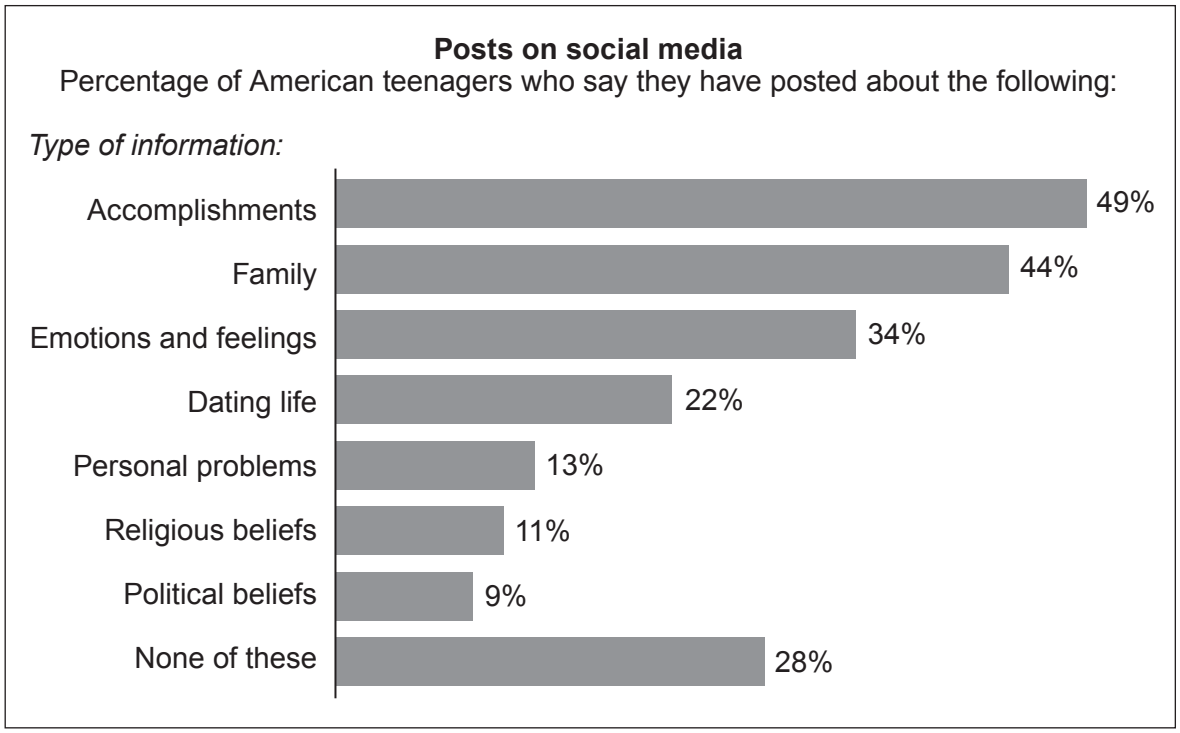
2. A survey was carried out in the U.S.A.
743 teenagers were interviewed.
They were asked what type of information they posted on social media.
The results were displayed on the internet, as shown below.



(a) How many times bigger is the percentage of the teenagers who posted about their family than the percentage who posted about their religious beliefs? [1]

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(b) What fraction of these teenagers posted about their emotions and feelings?
Give your answer in its simplest form. [1]

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(c) Dewi looks at the type of information posted by these teenagers.
What is the modal type of information? [1]

The modal type of information is .....

Examiner only

(d) What information would have been needed in the original data so that the following hypothesis could be tested? [1]

> In the U.S.A., teenage girls post about family more often than teenage boys.

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(e) How many of these 743 teenagers posted about their religious beliefs?
You must show all your working. [3]

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(f) Lottie is confused by the data in the diagram.

She says,

> This diagram can't be right, as all the bars don't add up to 100%.

The diagram is correct.
Explain why the bars do not add up to 100%. [1]

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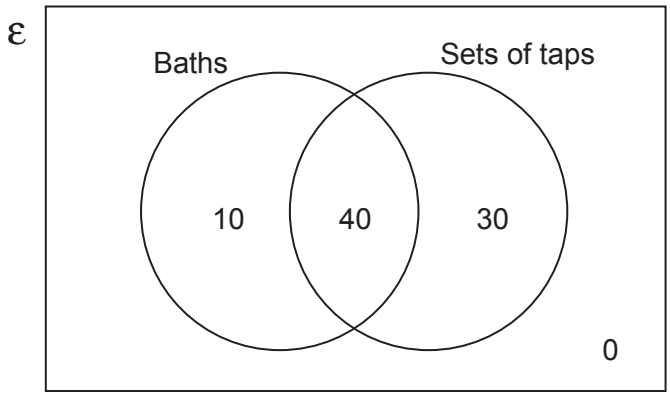
Examiner only

3. HydraDwr is a bathroom and plumbing shop.

(a) HydraDwr sells baths and sets of taps.

One day, 80 customers bought:
- one bath and one set of taps, or
- one bath, or
- one set of taps.

The Venn diagram shows the number of customers who bought these items.



(i) How many baths did these customers buy? [1]

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(ii) A bath costs £180.
A set of taps cost £60.

Calculate the total cost of the baths and sets of taps bought by these 80 customers. [3]

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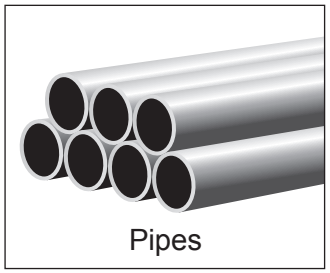
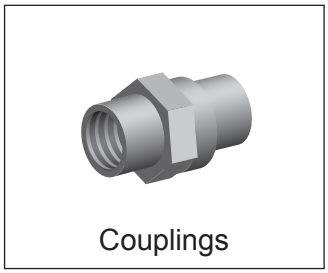
(b) HydraDwr also sells pipes and couplings to join the pipes.



Pipes



Couplings

(i) 3 pipes are joined together using 2 couplings, as shown below.

Diagram not drawn to scale

How many couplings are needed to join 6 pipes? [1]

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(ii) An equation is used to work out the number of couplings needed to join pipes.

P = the number of pipes
C = the number of couplings

Which of the following equations can be used to calculate the number of couplings needed?
Circle your answer. [1]

$C = 2P$ $C = P + 1$ $C = P - 1$ $C + P = 1$ $C = P$

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4. Alice used 400 kWh of electricity.
Electricity was charged at 32p per kWh.
The standing charge was £62.

VAT at 5% is payable on **all** the charges.
Calculate Alice's electricity bill.
You must show all your working. [5]

Examiner only

5. Lynette is ordering a T-shirt.
She wants her initial, L, printed on the T-shirt.

Details of Lynette's design are given below.

- The height is twice the width.
- The height is 10 cm.

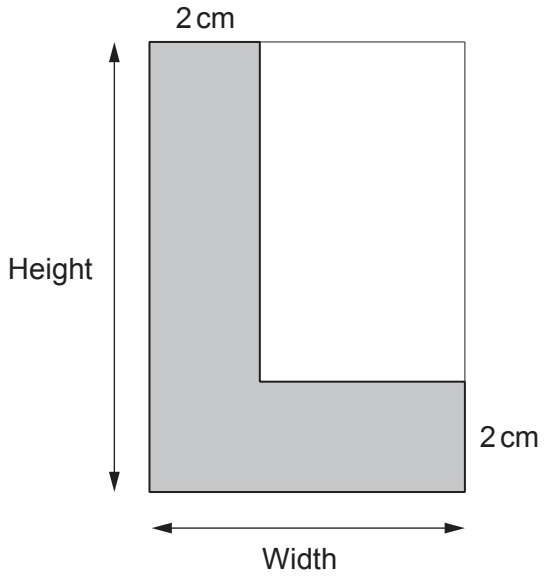

Diagram not drawn to scale

The cost of printing is 50p for an area of $2\,cm^2$.

How much will it cost Lynette to have her design printed on a T-shirt? [5]

Examiner only

6. A survey was carried out to find how often primary school children play board games.

A questionnaire was designed for primary school children to answer.
The following two questions were asked.

Q1. Do you live within 5 minutes' walking distance of school?

Q2. How often do you play board games?

Never	1–5 times	5–10 times	More than 10 times
☐	☐	☐	☐

(a) For each question, give **one** reason why it is **not** suitable. [2]

Q1. .....

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Q2. .....

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(b) The survey was carried out by leaving copies of the questionnaire in the local supermarket.

Give **one** criticism of how the survey was carried out. [1]

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Examiner only

7. Mari and Huw share a prize of £2700 in the ratio 4 : 5 respectively.

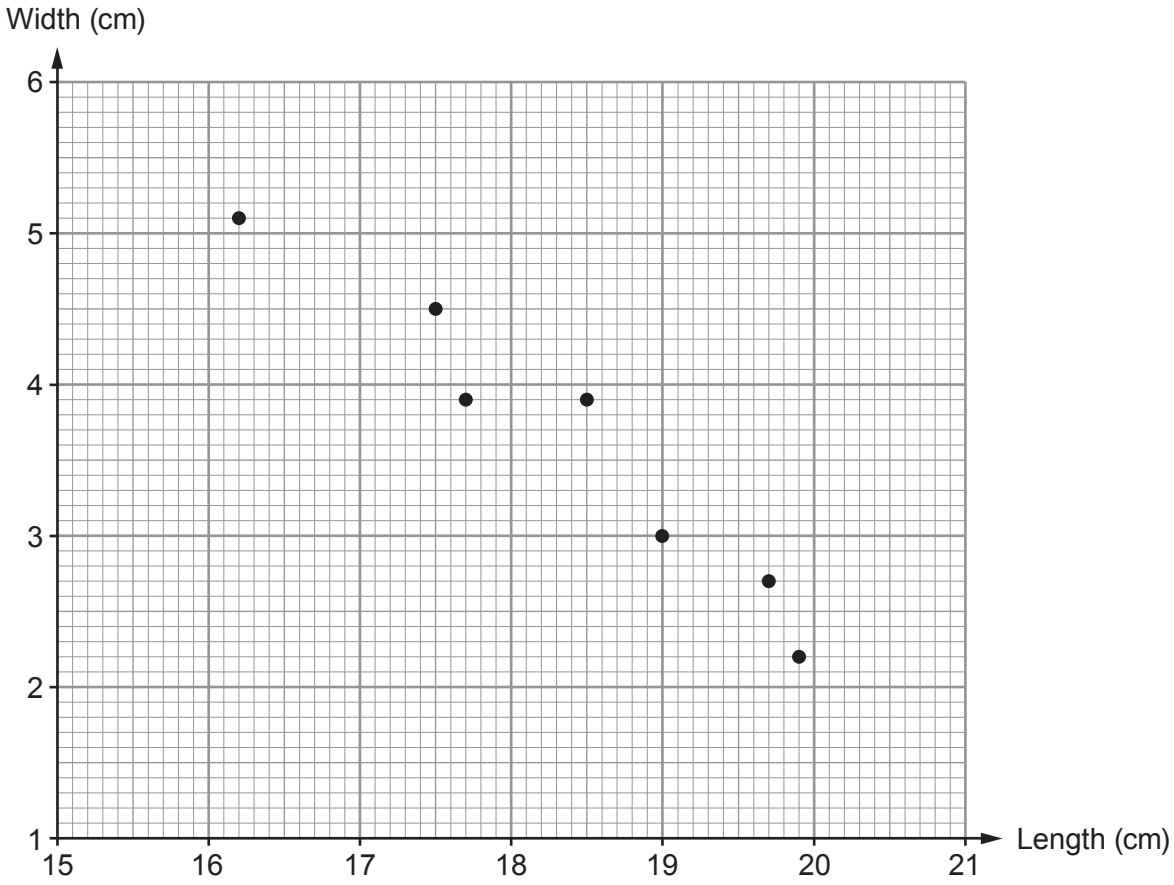
Mari decides to donate 24% of her share of the prize to charity.
Huw decides to give the same amount of money as Mari to charity.

What fraction of Huw's share of the prize money does he give to charity?
Express your answer in its simplest form.
You must show all your working. [6]

Turn over.

Examiner only

8. The scatter diagram shows the length and width of some television remote handsets.



(a) Two of the remotes have the same width.
Write down the width and lengths of these remotes. [2]

Width ..... cm

Lengths are ..... cm and ..... cm.

Examiner only

(b) Consider the remote with a width of 4·5 cm.
Write down the ratio of the width of this remote to its length.
Give your answer in its simplest form. [2]

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(c) How is it best to describe the correlation seen in this scatter diagram? [1]

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(d) Draw a line of best fit on the scatter diagram. [1]

(e) Is it **certain** that another television remote with length 18·5 cm will have a width in the range 3 cm to 4 cm?

Yes ☐ No ☐

You must give a reason for your answer. [1]

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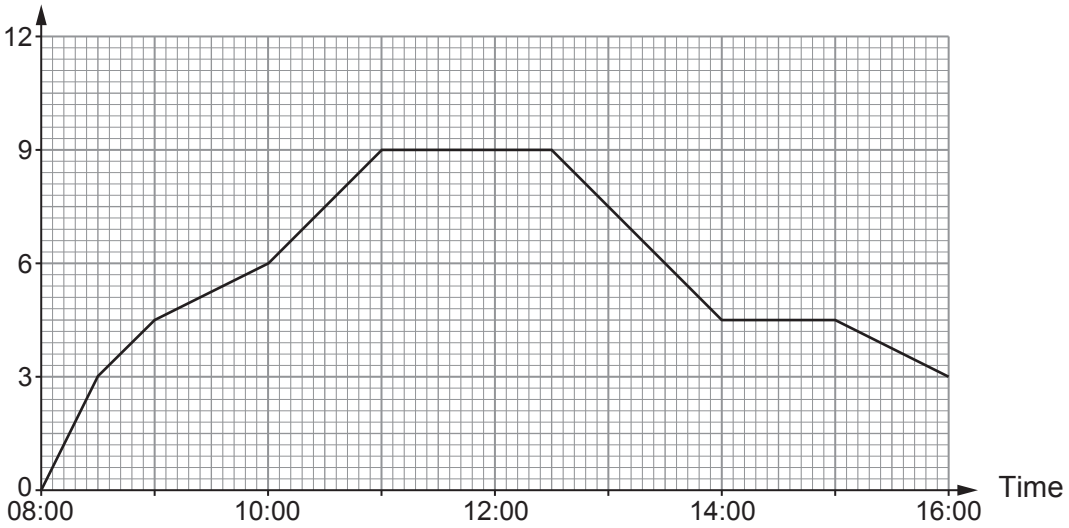
Examiner only

9. (a) Hesta and Walt hire a canal boat in Llangollen for their holiday.

Hesta records their distance along the canal from Llangollen between 8 a.m. and 4 p.m.
This is shown in the travel graph below.



(i) During the day, Hesta and Walt made stops by the side of the canal.
At what time did Hesta and Walt first stop at the side of the canal? [1]

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(ii) Between which two times were Hesta and Walt travelling the fastest?
Circle your answer. [1]

08:00 and 08:30 08:30 and 09:00 10:00 and 11:00

12:30 and 14:00 15:00 and 16:00

(iii) What is the total distance Hesta and Walt travelled in the boat between 8 a.m. and 4 p.m.?
Circle your answer. [1]

3 km 9 km 12 km 15 km 18 km

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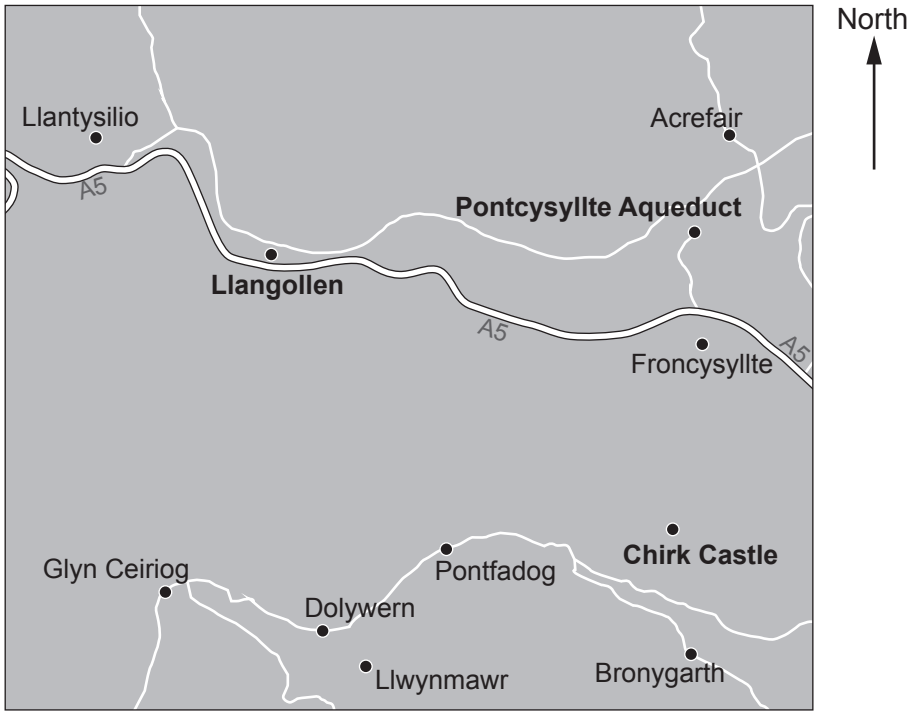
Examiner only

(b) Hesta and Walt visit Chirk Castle.



(i) Which is the best estimate for the bearing of Llangollen from Chirk Castle?
Circle your answer. [1]

060° 240° 120° 340° 300°

(ii) The direct straight-line distance between Llangollen and the Pontcysyllte Aqueduct is 5·6 km.
On the map this distance is 5·6 cm.
What is the scale of the map?
Circle your answer. [1]

1 : 10 1 : 1000 1 : 10 000 1 : 100 000 1 : 1 000 000

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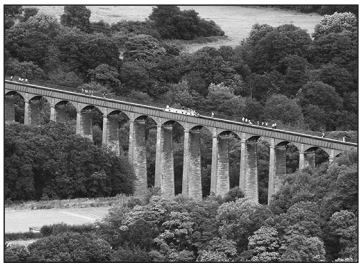
(c) The Pontcysyllte Aqueduct was built to carry the Llangollen canal over a valley.



The following facts about the section of the canal over the aqueduct were found on the internet.

- It has a rectangular uniform cross-section.
- It is 300 m in length.
- It holds 1 500 000 litres of water.
- It takes 2 hours to drain the water.

(i) The section of the canal over the aqueduct is to be drained.

Calculate the number of litres of water that drain from this section of the canal per minute.
You may assume that the water drains from the canal at a constant rate.
You must show all your working. [3]

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(ii) Calculate the area of the canal's uniform cross-section.
Give your answer in cm^2. [3]

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Examiner only

10. (a) A jar contains 300 g of chocolate spread.

In this spread:

- 58% of the mass is pure sugar,
- $\frac{1}{8}$ of the mass is cocoa,
- the mass of the milk powder is $\frac{4}{5}$ of the mass of cocoa,
- the remainder of the 300 g is palm oil.

Calculate the percentage of palm oil in the chocolate spread.
You must show all your working. [7]

(b) A different jar contains 840 g of chocolate spread.

The label on the jar says,

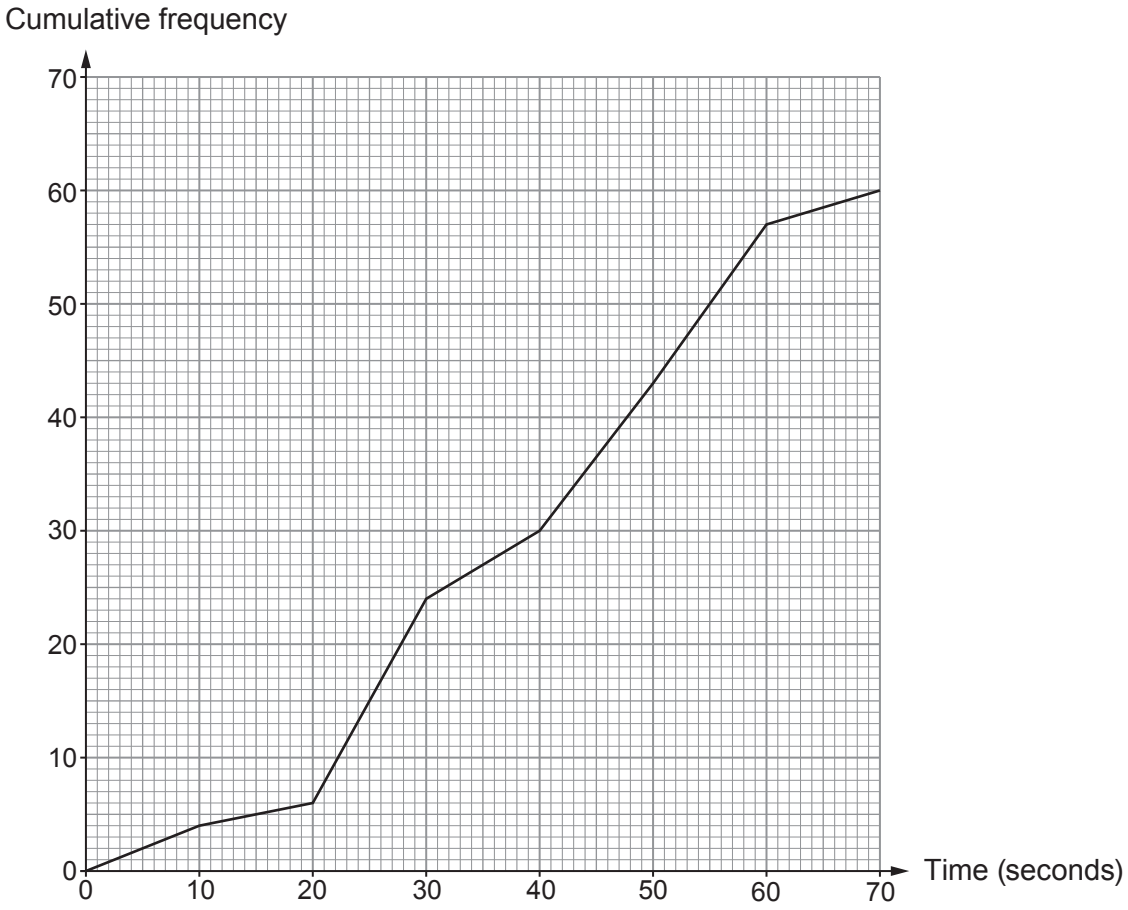
'Offer: includes 20% extra chocolate spread for free.'

How many grams of chocolate spread did a jar contain before the offer started? [3]

Examiner only

11. Deva Design Service employs 60 people.
Employees were asked to log on to their computer at 9 a.m. on Thursday.

The number of employees logged on was recorded every 10 seconds from 9 a.m.
The results are displayed in the cumulative frequency diagram shown below.



(a) Use the cumulative frequency diagram to estimate the median time taken by the employees to log on. [1]

..... seconds

(b) Deva Design Service has a policy that states the following:

'90% of employees should be logged on to their computer by 9:01 a.m.'

Show that this policy was met on Thursday.
You must show all your working. [3]

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Examiner only

12. Alan Frames is a company that employs 360 people.
6 of these people are to be selected to discuss changes to the company logo.

The manager has decided to use a systematic sampling method.
He has a numbered list of all 360 people.

(a) When using systematic sampling, where in the list **should** the manager start his selection of the 6 people?
Tick (✓) **one** of the boxes. [1]

The 60th name in the list	☐
At a randomly chosen name	☐
First person in the list	☐
Last person in the list	☐
A name by any multiple of 60 in the list	☐

(b) The manager actually starts by selecting the 4th name in his list.
Complete the table below to give the position in the list of the 6 people who would be selected using systematic sampling. [2]

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Person selected	1st	2nd	3rd	4th	5th	6th
Position in the list	4th	.....	.....	.....	.....	.....

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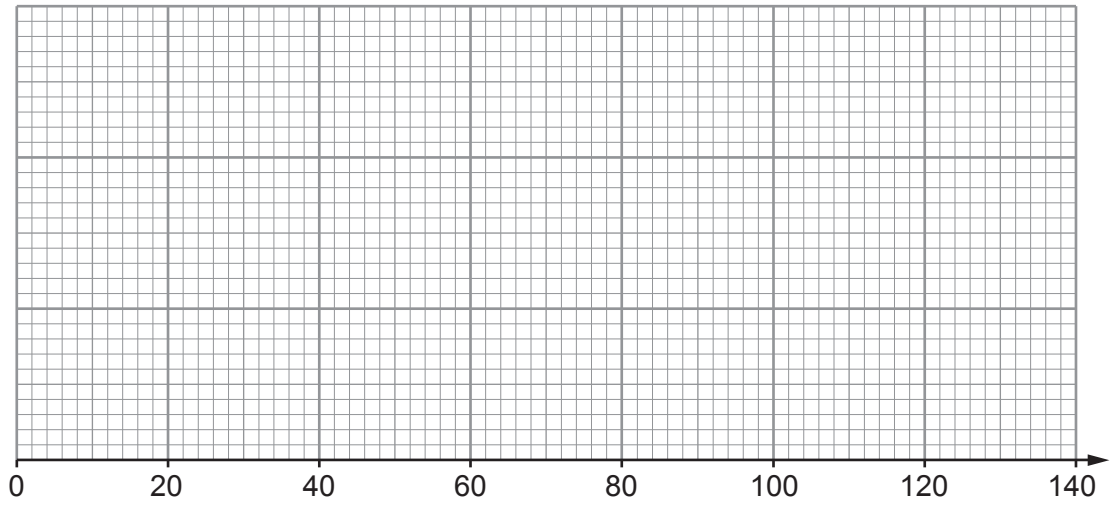
13. Dafydd works in a call centre.
On Monday, he made 200 phone calls.
He recorded the length of time he spent on each of these phone calls.

Dafydd noted the following about the times spent on each phone call.

- The greatest time was 2 minutes 10 seconds.
- The range of the times was 2 minutes.
- The median time was 84 seconds.
- The upper quartile was 108 seconds.
- The interquartile range was 68 seconds.

(a) Use the graph paper to draw a box-and-whisker diagram to represent Dafydd's data. [4]

Length of time on each of 200 phone calls



(b) Dafydd was set a target.
He had to complete half of his phone calls in less than 1 minute 30 seconds each.
By how many seconds did Dafydd beat this target?
Circle your answer. [1]

4 seconds 6 seconds 10 seconds 12 seconds 18 seconds

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(c) On Monday, how many of Dafydd's phone calls lasted less than 108 seconds? [2]

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..... phone calls

END OF PAPER

Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

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