Surname	Centre Number	Candidate Number
Other Names		0

GCSE

3310U40-1

A17-3310U40-1

MATHEMATICS – NUMERACY
UNIT 2: CALCULATOR-ALLOWED
INTERMEDIATE TIER

WEDNESDAY, 8 NOVEMBER 2017 – MORNING

1 hour 45 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**8**	
2.	**8**	
3.	**6**	
4.	**4**	
5.	**12**	
6.	**9**	
7.	**18**	
8.	**7**	
9.	**8**	
Total	**80**	

3310U401
01

ADDITIONAL MATERIALS

A calculator will be required for this paper.

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 continuation page at the back of the booklet. Question numbers must be given for all work written on the continuation page.

Take π as 3·14 or use the π button on your calculator.

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***(b)*, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

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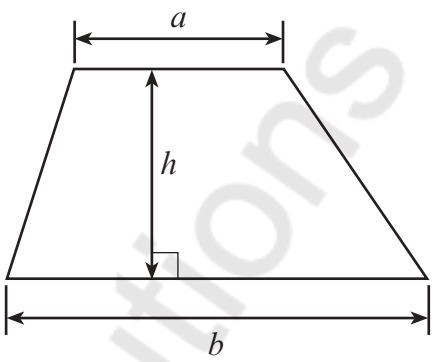
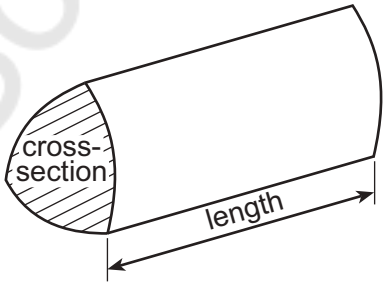
Formula List – Intermediate Tier

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



Volume of prism = area of cross-section × length



Examiner

1.

Raspberries cost £3.60 per kg

Pears cost £2.60 per kg

Rate of Raspberries Cost = Cost / mass

Rhys buys some raspberries and some pears.
Rhys weighs the fruit he buys.
The raspberries cost him £4.50.

(a) Calculate the mass of the raspberries Rhys buys. [2]

Raspberries cost €3.60 per kg

$R = \frac{C}{m}$; $m = \frac{C}{R} = \frac{4.50}{3.60} = 1.25\text{kg}$

(b) He finds that the mass of the pears is three times the mass of the raspberries.
How much change does Rhys get from £20 when buying the raspberries and pears?
You must show all your working. [4]

Since mass of raspberries is 1.25kg

mass of pears = 3x 1.25 = 3.75kg

Cost of raspberries = €4.50

cost of pears = ?

$R = \frac{C}{m}$; $C = R \times m$

$C = 2.60 \times 3.75 = €9.75$ ✓

Total Cost of fruits = €9.75 + €4.50
= €14.25

Rhys Account = €20

Balance = 20 − 14.25
= €5.75

03

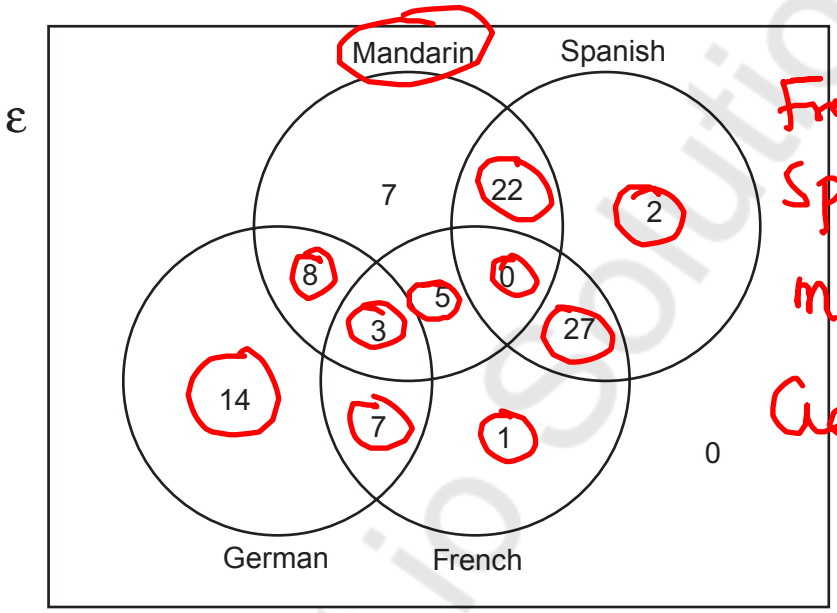
Examiner only

2. The Headteacher of Ysgol Maes Newydd gave *option forms* to all Year 9 pupils.

The form asked which foreign languages the pupils would like to study in Year 10.

There were 4 languages listed on the form: French, German, Spanish and Mandarin.
The pupils could select as many of the languages as they wished.
All pupils completed and returned the *option form*.

The Headteacher displayed the results in a Venn diagram, as shown below.



French = 43
Spanish = 51
Mandarin = 45
German = 32

(a) How many pupils did not select at least one of the four languages?
Circle your answer. [1]

0 1 3 5 7

(b) How many pupils are there in Year 9?
Circle your answer. [1]

92 94 96 98 100

(c) How many pupils selected only one language? [1]

14 + 7 + 2 + 1 = 24

Examiner only

(d) Which was the most popular language selected?
You must show all your working. [3]

So, the most popular selected language is Spanish (51 pupils)
Spanish → 51
Mandarin → 45
French → 43
German → 32

(e) The Headteacher can offer only 2 out of these 4 languages in Year 10.
She writes the timetable so that as many as possible of the pupils who chose 2 languages are able to study those 2 languages.
Which **two** languages will the Headteacher offer in Year 10?
You must show all your working and give a reason for your answer. [2]

Mandarin & French = 8
Mandarin & German = 8
Mandarin & Spanish = 22
French & German = 10
French & Spanish = 27
German & Spanish = 0

Since, French and Spanish has the highest pupil that study 2 of these languages, Then, the head master will take french and Spanish.

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05

Examiner only

3. Lloyd has carried out a survey in his school.
He surveyed 300 pupils.
Below is a section from his questionnaire.

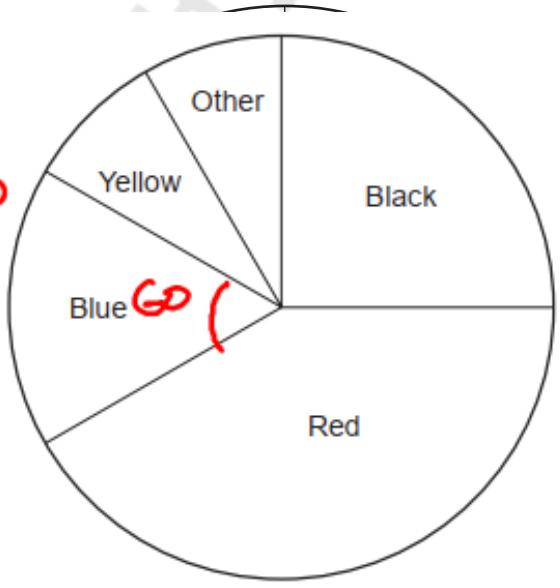
1.	Which year group are you in? .....
2.	Do you like the colours of the school uniform? .....
3.	What is your favourite colour? .....

(a) Afterwards, Lloyd thinks he should have given option boxes in questions 1 and 2.
What could these option boxes be? [2]

Question 1: Year 8 ☐ Year 9 ☐ Year 10 ☐

Question 2: Yes ☐ No ☐ Other ☐

(b) A pie chart displaying the results from question 3 of the questionnaire is shown below.



Angle of 75 pupils

$\theta = \frac{\text{No of Pupil}}{\text{Total no of Pupils}} \times 360$

$\theta = \frac{75}{300} \times 360$

$\theta = 90°$

$\frac{60}{360} = \frac{1}{6}$

(i) Which colour was chosen by 75 pupils as their favourite colour?
Circle your answer. [1]

Black Red Blue Yellow Other

Assuming Blue has $\theta = 60°$

Number of blues $= \frac{\theta}{360} \times$ Total pupils $= \frac{60}{360} \times 360$

Examiner only

(ii) What fraction of the pupils said that blue was their favourite colour? Give your answer in its simplest form. [3]

Blue $= 50°$

Fraction of Blue $= \frac{60}{360} = \frac{1}{6}$

7. *(a)* What is 3 hours 12 minutes in hours? Circle your answer. [1]

3·102 hours 3·12 hours 3·15 hours 3·2 hours 3·25 hours

3hrs 0·2hrs

60 minutes = 1hr

12 × 1min $= \frac{1}{60}$ hr × 12

3hrs = 3hrs

12minutes = 0·2hrs

12minutes $= \frac{1}{60}$ hr × 12

3·2hrs

(b) The first 40 miles of a journey took 1 hour 15 minutes. The remaining 80 miles were completed in 2 hours 15 minutes. Calculate the average speed, in mph, of the 120-mile journey. [3]

40miles ⟶ 1hr 15 minutes

↓

Remaining 80miles ⟶ 2hrs 15 minutes

A·S = $\frac{\text{Total Distance}}{\text{Total time}}$ Distance = 120miles

Total time = 1hr 15min + 2hrs 15min

= 3hrs 30mins

= 3·5 hrs

A·S = $\frac{120}{3·5}$ = 34.29 mph

Examiner only

5. A newspaper report claimed the following:

- 12% of the world population is left-handed.
- Twice as many men as women are left-handed.
- 30% of the world population is mixed-handed.
  Mixed-handed people prefer to use the left hand for some tasks and the right hand for others.
- It is very rare to be ambidextrous, that is being able to do all tasks equally well with either hand.

In 2011, Wales had a population of 3063000.
In 2014, Wales had a population of 3092000.

(a) Calculate the number of left-handed people living in Wales in 2011.
State what assumption you have made. [3]

2011: Population = 3,063,000
2014: Population = 3,092,000
Left hand = 12% of Population
$= \frac{12}{100} \times 3,063,000 = 367,560$

Assumption:
We assume that 12% of the world population is the same as 12% of wales population i.e The newspaper is correct for wales population.

(b) In 2011, Wales had a population of 3063000.
1559000 of these people were women.

In 2011, what **percentage** of the population of Wales were **men**?
Give your answer correct to 1 decimal place. [3]

% of men $= \frac{\text{number of men}}{\text{Total population}} \times 100$

men $= 3062000 - 1559000 = 1,504,000$

% of men $= \frac{1,504,000}{3,062,000} \times 100 =$

% of men $= 49.1\%$

Examiner only

(c) How many mixed-handed people do you think were living in Wales in 2014?
You must show your working.
Give your answer to the nearest 1000 people. [2]

Population in wales in 2014 = 3,092,000
% of mixed handed people = 30%
mixed handed people = 30% of population in wales
mixed handed people = $\frac{30}{100} \times 3092000$
= 927,600
To nearest 1000 = 928,000 ✓

(d) A country of 6 million people meets all the claims given in the newspaper report.
8% of the women in this country are left-handed.

There are 3 million men living in this country.
How many left-handed men would you expect there to be in this country? [4]

Total population = 6,000,000
Men = 3,000,000
women = 3,000,000
8% of women are left handed
left handed women = $\frac{8}{100} \times 3,000,000$
= 240,000 women LH

Left handed people = $\frac{12}{100} \times 6,000,000$
= 720,000 people are left handed

men that are left handed = 720,000 − 240,000
= 480,000 men are left handed

401

END OF PAPER

Examiner only

1. Alptai is a ski resort.
The daily snowfall for January is given in the table below.

Daily snowfall, s (cm)	Number of days
$0 \leqslant s < 5$	10
$5 \leqslant s < 10$	16
$10 \leqslant s < 20$	4
$20 \leqslant s < 30$	0
$30 \leqslant s < 50$	1

(a) Calculate an estimate for the mean daily snowfall for the 31 days of January. [4]

x	x_m	f	$fx x_m$
0 – 5	2.5	10	25
5 – 10	7.5	16	120
10 – 20	15	4	60
20 – 30	25	0	0
30 – 50	40	1	40
		$\Sigma f = 31$	$\Sigma f x_m = 245$

$$\bar{x} = \frac{\Sigma f x_m}{\Sigma f} = \frac{245}{31} = 7.9 \text{ cm}$$

(b) Circle either TRUE or FALSE for each of the following statements. [2]

The table above shows that there definitely was snowfall on each of the 31 days in January.	TRUE	FALSE
There were 16 days when the daily snowfall was less than 10 cm.	TRUE	FALSE
There was only 1 day with snowfall greater than or equal to 20 cm.	TRUE	FALSE
The modal group also contains the median daily snowfall.	TRUE	FALSE

Examiner only

(c) For the 28 days of February, the mean daily snowfall in Alptai was 9 cm.
On 1st February, the snowfall recorded in Alptai was 63 cm.
Calculate the mean daily snowfall for the 27-day period 2nd to 28th February. [3]

mean (28 days) = 9cm

1st of February = 63cm

mean = $\frac{\text{Sum of data}}{\text{frequency}}$

Sum of Snowfall for february = mean x freq
= 9 x 28
= 252cm

So, removing 1st of february

Then, the remaining 27 days will have a total of 252 - 63

189cm

mean (27 days) = $\frac{189}{27}$

mean (27 days) = 7cm

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Examiner only

7. *(a)* Bronwen and Alvaro decide to keep some alpacas on their farm in Patagonia.

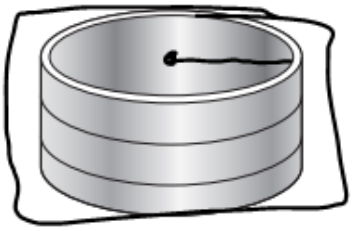
Alvaro knows it is possible to keep between 4 and 6 alpacas on each acre of suitable farmland.
They have 13 hectares of farmland that they want to use to keep the alpacas.
Bronwen knows that 1 acre is 4046·86 m^2 and that 10 000 m^2 = 1 hectare.

Use this information to advise Bronwen and Alvaro on the number of alpacas they could keep on their farmland.
State any assumption that you make.
You must show all your working. [6]

4–6 alpacas → 1 acre
Total farm land → 13 hectare
1 acre → 4046·86 m^2
10000 m^2 → 1 hectare
Total farm land → 13 × 10,000 = 130,000 m^2
Total farm land = 130,000 m^2 × $\frac{1\text{ acre}}{4046.86 m^2}$
Total Farm Land = 32 acres.
1 acre → 6 alpacas
Total animal = 32 × 6 = 192 alpacas

Assumption:
We assume that the maximum alpacas 1 acre can take is 6. So, we will get maximum value for the farm land

(b) Bronwen decides to place a cylindrical water container in the small paddock on the farm.



$r = \frac{d}{2} = \frac{1.4}{2}$
$r = 0.7m$

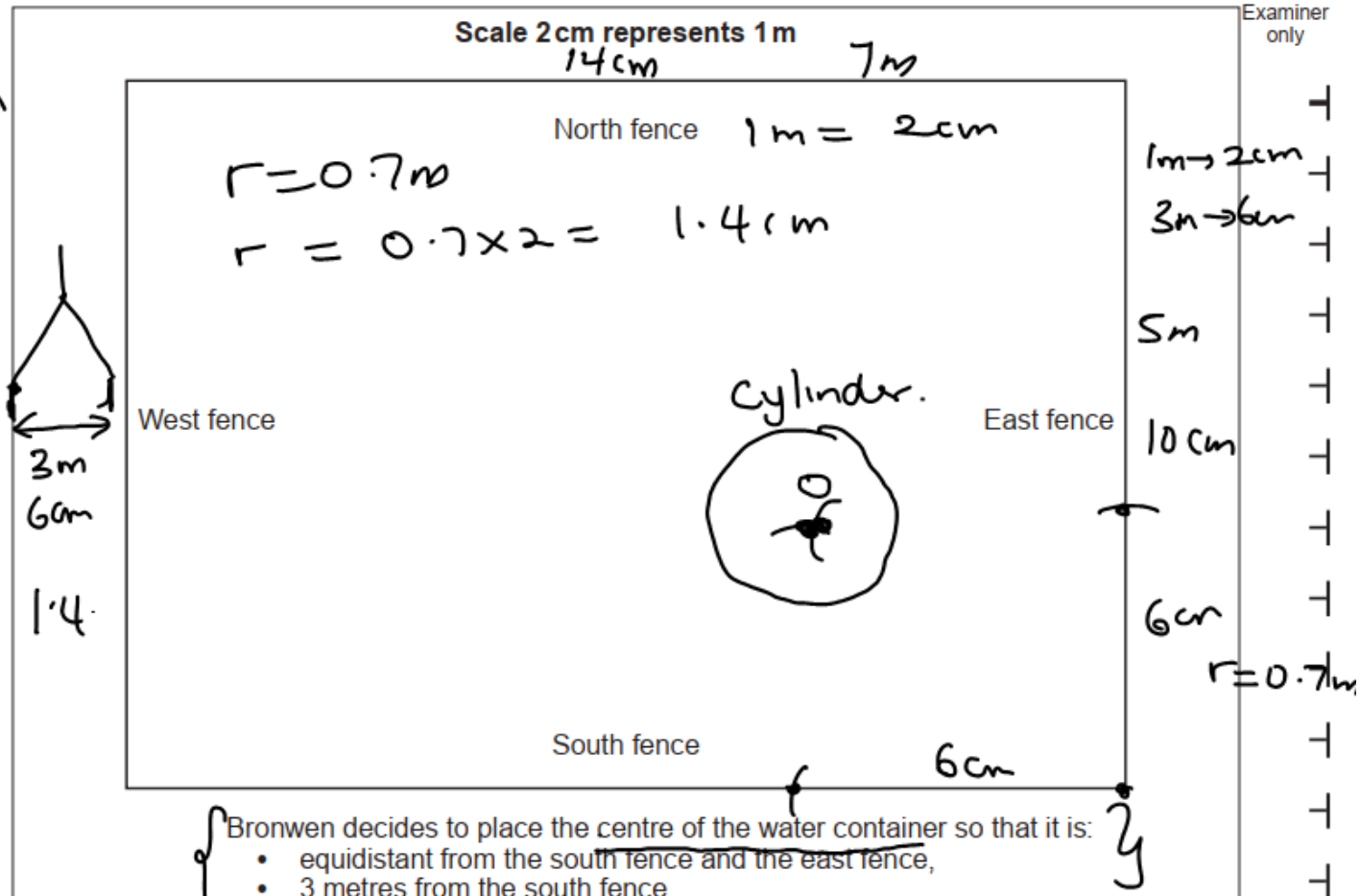
The water container has a diameter of 1·4 metres.

(i) The scale diagram opposite shows the small paddock on the farm.
The small paddock is rectangular, measuring 7 metres by 5 metres.

1 m = 100 cm
r = 0·7 m
r = 0·7 × 100 = 70 cm

2cm → 1m 7m

Examiner only



Bronwen decides to place the centre of the water container so that it is:

- equidistant from the south fence and the east fence,
- 3 metres from the south fence.

Show the placement of the water container on the scale diagram of the small paddock above.
Your diagram should include an **accurate plan view** of the **water container**. [4]

(ii) The water container holds 900 litres of water when full.
Calculate the height of the water container in centimetres. [4]

Volume of water = 900 litres

1 litre = 1000 cm^3

900 litre = 900 x 1000 cm^3

900 ltr = 900,000 cm^3

$V = \pi r^2 h$

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

r = 70 cm

$h = \frac{900,000}{3.14 \times 70^2}$

h = 58.5 cm

The height of the water container is 58.5 cm

Examiner only

(c) The currency widely used in Patagonia is the Argentine peso.

Alvaro sells alpaca fleeces from Patagonia.
His fleeces are priced in Argentine pesos.
Tom lives in Wales and buys fleeces from Alvaro.
Tom pays for the fleeces in pounds.

Tom's purchases are shown in the table below.

	Number of fleeces bought	Price per fleece, in Argentine pesos	Exchange rate
January 2015	80	19.20	£1 = 15.47 Argentine pesos
March 2016	20	22.30	£1 = 15.21 Argentine pesos
April 2017	100	24.50	£1 = 14.93 Argentine pesos

For each of Tom's 3 purchases he paid correct to the nearest penny.

How much did Tom pay for these 200 fleeces, in pounds?
Give your answer correct to the nearest penny.
You must show all your working. [4]

First Case
Fleeces bought = 80
Price per fleece = 19.20
Cost in Pesos = 19.20 × 80
= 1536 peso
£1 = 15.47 Peso
Cost in pounds = 1536 / 15.47
€99.29

Second case
Fleece Bought = 20
Price/fleece = 22.30
Cost in Pesos = 20 × 22.30
= 446 peso
Cost in pounds
Cost = 446 / (5.2)
€29.32

Third Case
Fleece Bought = 100
Price/fleece = 24.50
Cost in peso = 100 × 24.50
= 2450 peso
Cost in pounds
Cost = 2450 / 14.93
€164.10

Total cost in pounds = 99.29 + 29.32 + 164.10
= €292.71

€292.71

Tom paid £ ....., correct to the nearest penny

Examiner only

8. Handmade socks, knitted using pure cashmere wool, are very expensive to buy.

Rowena buys cashmere wool in 20 g balls.
Each ball of cashmere wool costs her £1.42.
She pays her sister £8 to knit each pair of socks.
135 g of cashmere wool is used to knit each pair of socks.

Rowena sells 40 pairs of cashmere socks for £18.95 per pair.
What is her percentage profit?
Give your answer correct to 2 significant figures.
You must show all your working. [7]

Cashmere wool is sold in 20g
Each ball of cashmere wool = €1.42
Production cost = €8 per pair Sister
135g of cashmere wool → 1 pair of socks
Selling price of socks → €18.95 / pair
Total Quantity Sold → 40
Total Selling Price = 18.95 × 40 = €758 //
Cashmere wool ball needed = $\frac{135}{20}$ = 6.75 ball
Since Cashmere wool is sold in ball, then she needs 7 ball.
Cost of 7 balls = 7 × €1.42 = €9.94 *
Total cost for a pair of socks = 9.94 + 8
= €17.94
Cost of 40 pairs of socks = 17.94 × 40
= €717.6 .
Profit = Selling price − Cost price = €758 − €717.6
= €40.4
% Profit = $\frac{\text{Profit}}{\text{Cost Price}} \times 100$

Rowena's percentage profit when selling all 40 pairs of socks is ..... %, correct to 2 significant figures.

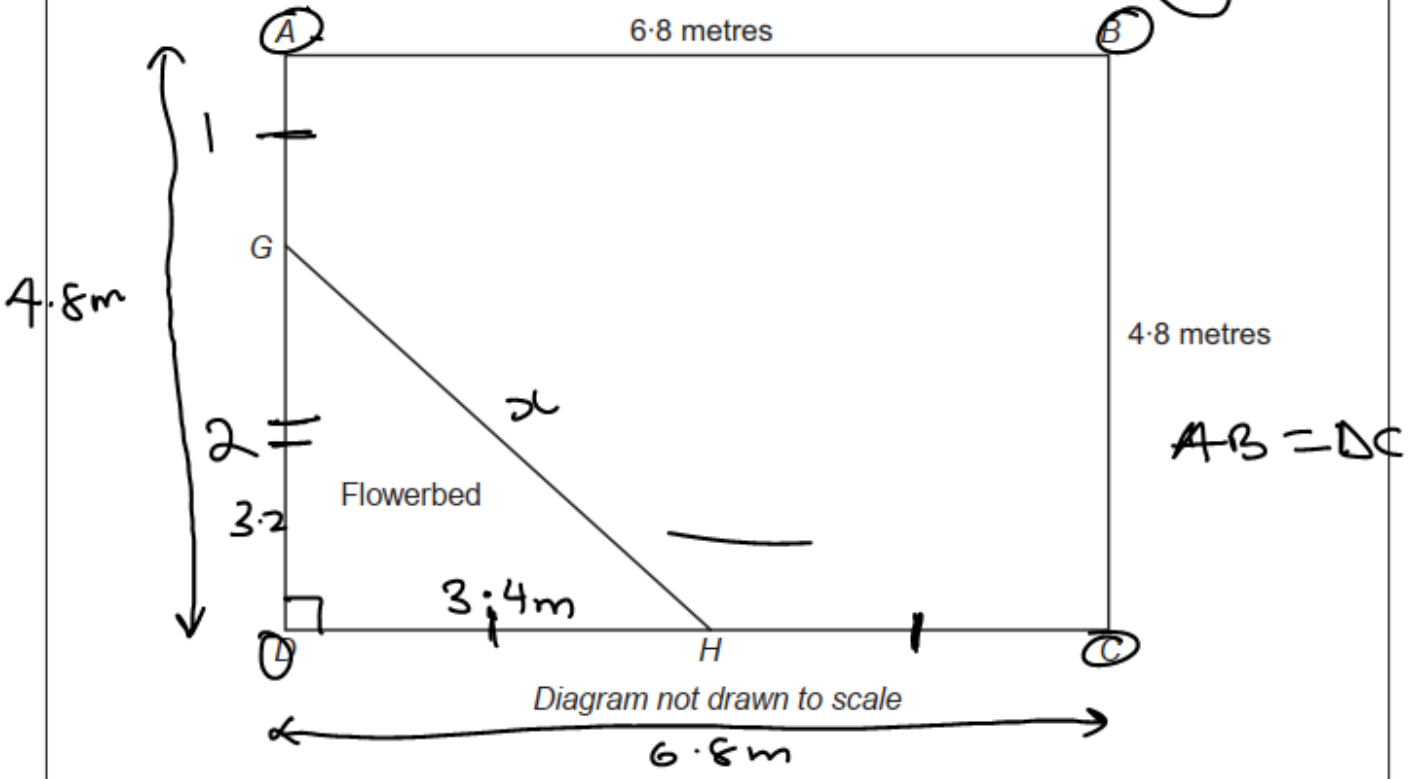
% Profit = $\frac{40.4}{717.6} \times 100 = 5.6\%$

Examiner only

9. Bethan has a plan of her rectangular lawn, which she has labelled *ABCD*.
She wants to cut out a triangular flowerbed from her lawn, labelled *GHD*.
Bethan decides that *AG* : *GD* should be 1 : 2 and that *DH* = *HC*.

She has made a sketch shown below.

AD : GD = 1 : 2



AB = DC

(a) Calculate the length of *GH*. [4]

Using ratio

$GD = \frac{2}{3} \times 4.8$

Applying pythagoras theorem

$GH^2 = GD^2 + DH^2$

$GH^2 = 3.2^2 + 3.4^2$

$GH^2 = 10.24 + 11.56$

$GH^2 = 21.8$

$GH = \sqrt{21.8}$

$GH = 4.67m$

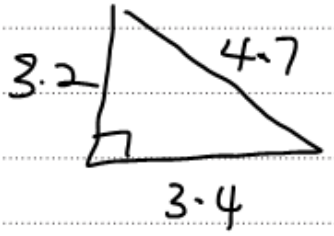
Examiner only

(b) The flowerbed, *GHD*, is to have a flexible edging strip placed around its perimeter. The edging strip costs £3.50 per metre and can only be bought in strips of complete metres.

- How much will the edging strip cost Bethan?
- What length of strip will be left over? Give your answer in centimetres. [4]

Cost of edge strip = €3.50 / metre

Perimeter of the flowerbed



Perimeter = 3.2 + 4.7 + 3.4

= 11.3m.

So, to complete the edge strip, he needs to buy 12m long edge strip.

Cost = €3.50 / metre

Total Cost = 3.50 × 12

= €42

1m = 100cm

Excess length = 12m − 11.3m = 0.7m

0.7m = 0.7 × 100 = 70cm

Cost £ 42

70 cm left over

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

Examiner only

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