Surname StemUp Model Solution	Centre Number	Candidate Number
Other Names		0

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GCSE – NEW

3310U10-1

A16-3310U10-1

MATHEMATICS – NUMERACY
UNIT 1: NON-CALCULATOR
FOUNDATION TIER

WEDNESDAY, 2 NOVEMBER 2016 – MORNING

1 hour 30 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 continuation page at the back of the booklet, taking care to number the question(s) correctly.

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 **3**, 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.	10	
2.	5	
3.	8	
4.	9	
5.	3	
6.	6	
7.	3	
8.	7	
9.	6	
10.	4	
11.	4	
Total	65	

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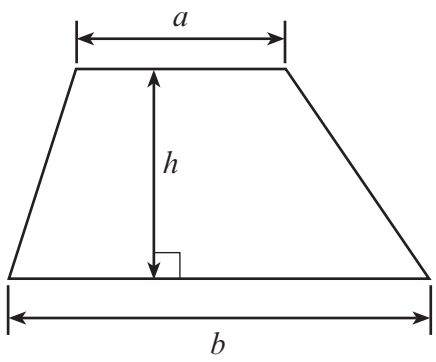
Formula List - Foundation Tier

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



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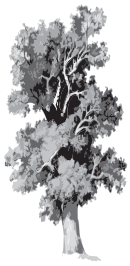
1. A landscape gardener designs gardens.
He uses a coordinate grid to show the position of plants and trees.
He has started to create a plan for one of his customers.
The table below shows some of the items that are to be put into the garden.

Wooden table & chairs	Fountain	Flowering shrub
 Large tree	Winter tree	Flowering tree

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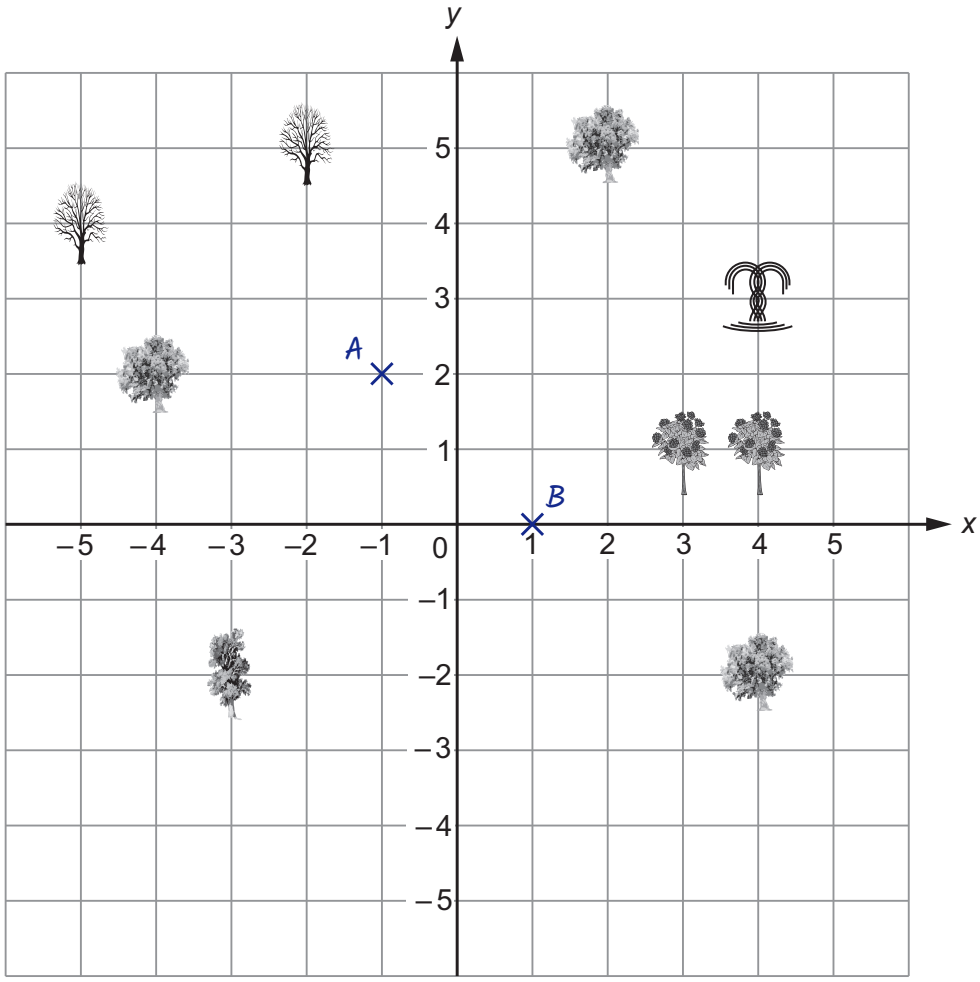
(a) What are the coordinates of the fountain?
Circle your answer. [1]

(4, 3) (3, 3) (3, –3) (3, 4) (4, –3)



(b) The gardener is going to place
- the wooden table and chairs at *A* (–1, 2)
- a flowering shrub at *B* (1, 0).

Plot the **positions** of points *A* and *B* on the grid above. [2]

(c) The lawn in the garden is rectangular.
It has length 4·5 metres and width 3 metres.

(i) What units should be used for the area of the lawn?
Circle your answer. [1]

m cm m^2 m^3 yards

(ii) What is the area of the lawn? [2]

Area = length × width = 4.5 × 3

= 12 + 1.5 = 13.5 m^2

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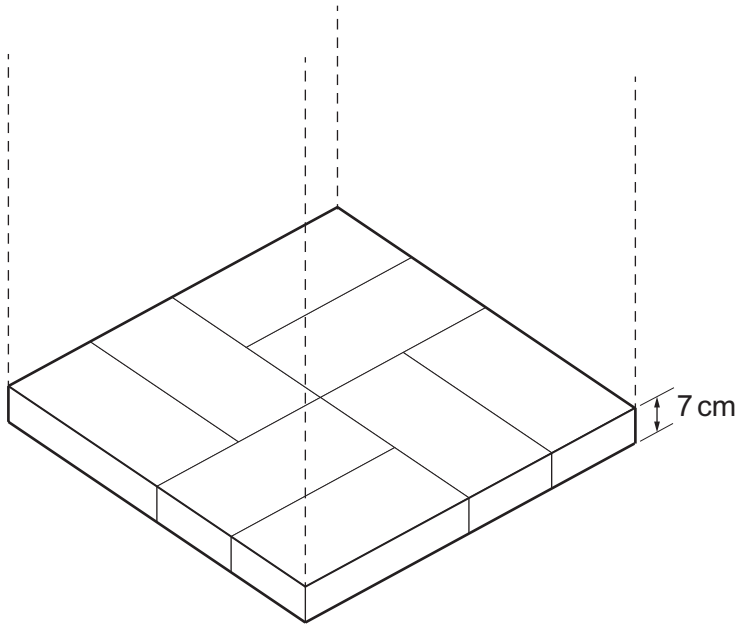
(d) The gardener has a stack of bricks to build a barbeque.
The stack is 154 cm tall.

Each layer of bricks has the pattern shown below.



The thickness of one layer of bricks is 7 cm.
How many bricks are there in the stack altogether? [4]

Number of layers = 154 ÷ 7

7 × 20 = 140, 154 − 140 = 14 = 7 × 2, so 154 ÷ 7 = 22 layers

Number of bricks in one layer = 8

Total number of bricks = 22 × 8 = 176

There are 176 bricks in the stack altogether.

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2. A flight to New York had 450 passengers.
A survey was completed to see what the 450 passengers did for most of their time during the flight.

- 120 passengers watched films
- 60 passengers played games
- 130 passengers listened to music
- 30 passengers read a book
- The rest slept.

Draw a pictogram to represent what the 450 passengers did for most of their time during the flight to New York. [5]

Key: represents 20 passengers.

Time spent								
Watching films	☺	☺	☺	☺	☺	☺		
Playing games	☺	☺	☺					
Listening to music	☺	☺	☺	☺	☺	☺	◐	
Reading a book	☺	◐						
Sleeping	☺	☺	☺	☺	☺	◐		

Number who slept = 450 − (120 + 60 + 130 + 30) = 450 − 340 = 110

Faces: films 120 ÷ 20 = 6, games 60 ÷ 20 = 3, music 130 ÷ 20 = 6½

book 30 ÷ 20 = 1½, slept 110 ÷ 20 = 5½

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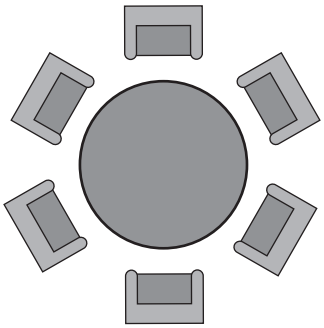
3. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

Aled plans a Christmas party.
He decides to use *Table Toppers* to supply tables, chairs and catering.
The circular tables each seat 6 people and the rectangular tables each seat 10 people.



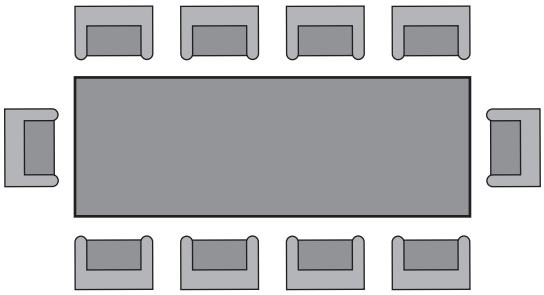


Table Toppers charge as shown below.

Table Toppers		
Hiring Fees	Circular tables	£3 each
	Rectangular tables	£4 each
	Chairs	£2 each
Catering	Buffet	£9 per person
	Hog Roast	£12 per person

All the people invited to the party will fit around 3 circular tables and 2 rectangular tables.
There will be no spare seats.

Aled hires 3 circular tables, 2 rectangular tables, and a chair for each person at the party.
He decides to provide a buffet meal for each person.

How much does *Table Toppers* charge Aled in total?
You must show all your working. [6 + 2 OCW]

Number of people = 3 × 6 + 2 × 10 = 18 + 20 = 38 people

Cost of tables = 3 × £3 + 2 × £4 = £9 + £8 = £17

Cost of chairs = 38 × £2 = £76

Cost of buffet = 38 × £9 = £342

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Working for the buffet: $38 \times 9 = 30 \times 9 + 8 \times 9 = 270 + 72 = 342$

Total cost = cost of tables + cost of chairs + cost of buffet

= £17 + £76 + £342

= £435

Table Toppers charge Aled £435 in total.

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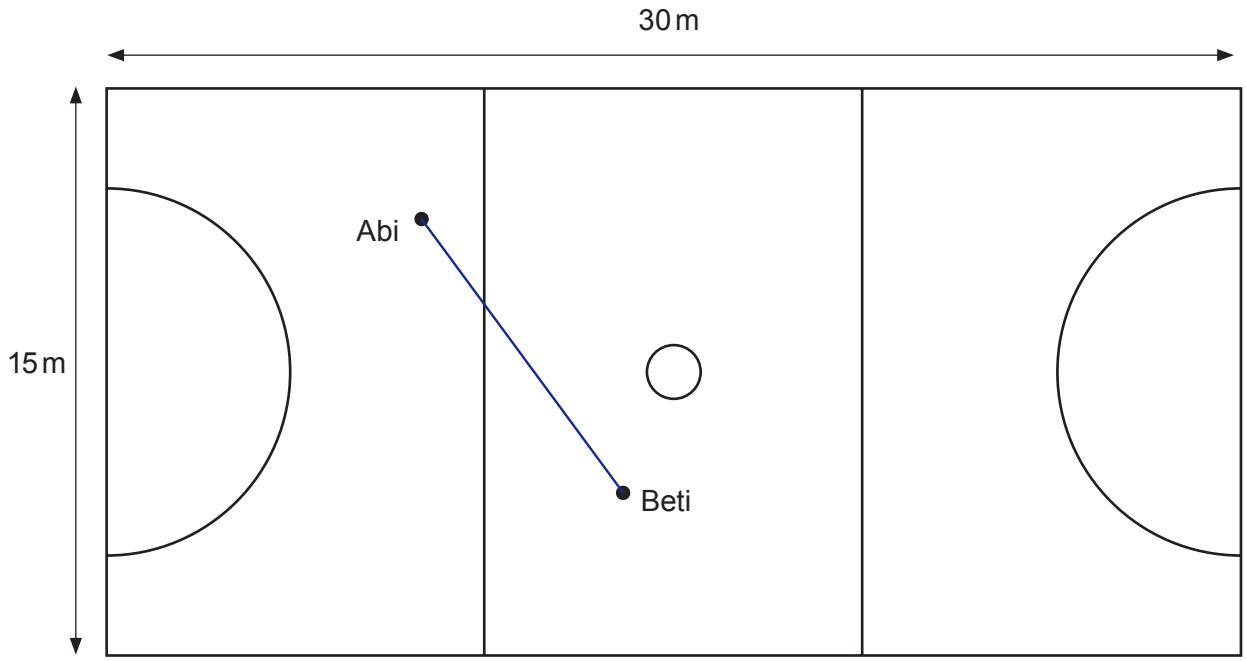
4. The diagram shows a scale drawing of a netball court.



(a) All of the **straight** lines on the netball court are to be painted white.
What is the total length of the white lines that need to be painted? [2]

Two long sides: 30 + 30 = 60 m. Four lines across: 15 + 15 + 15 + 15 = 60 m

Total = 30 + 30 + 15 + 15 + 15 + 15 = 120

Total length of white lines = 120 m

(b) The scale used in the diagram is **1 cm represents 2 m**.

Abi passes the ball to Beti.
Use the scale to work out the distance between Abi and Beti in metres. [2]

Distance from Abi to Beti on the diagram = 4.5 cm

Real distance = 4.5 × 2 = 9 m

The distance between Abi and Beti is 9 metres.

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(c) Abi, Beti, Cala and Delaney played a practice game.
Abi scored 9 goals.
Beti scored 6 goals.
Cala scored 5 goals.

The mean number of goals scored by all four players was 7.
How many goals did Delaney score? [4]

Total goals scored = 4 × 7 = 28

Abi + Beti + Cala = 9 + 6 + 5 = 20

Delaney = 28 − 20 = 8

Delaney scored 8 goals.

(d) The practice game started at 3:55 p.m.
Cala scored her first goal after 12 minutes.
At what time did Cala score her first goal?
Circle your answer. [1]

3:43 p.m. 15:67 04:07 3:07 p.m. 16:07

3:55 p.m. + 5 min = 4:00 p.m., + 7 min = 4:07 p.m. = 16:07

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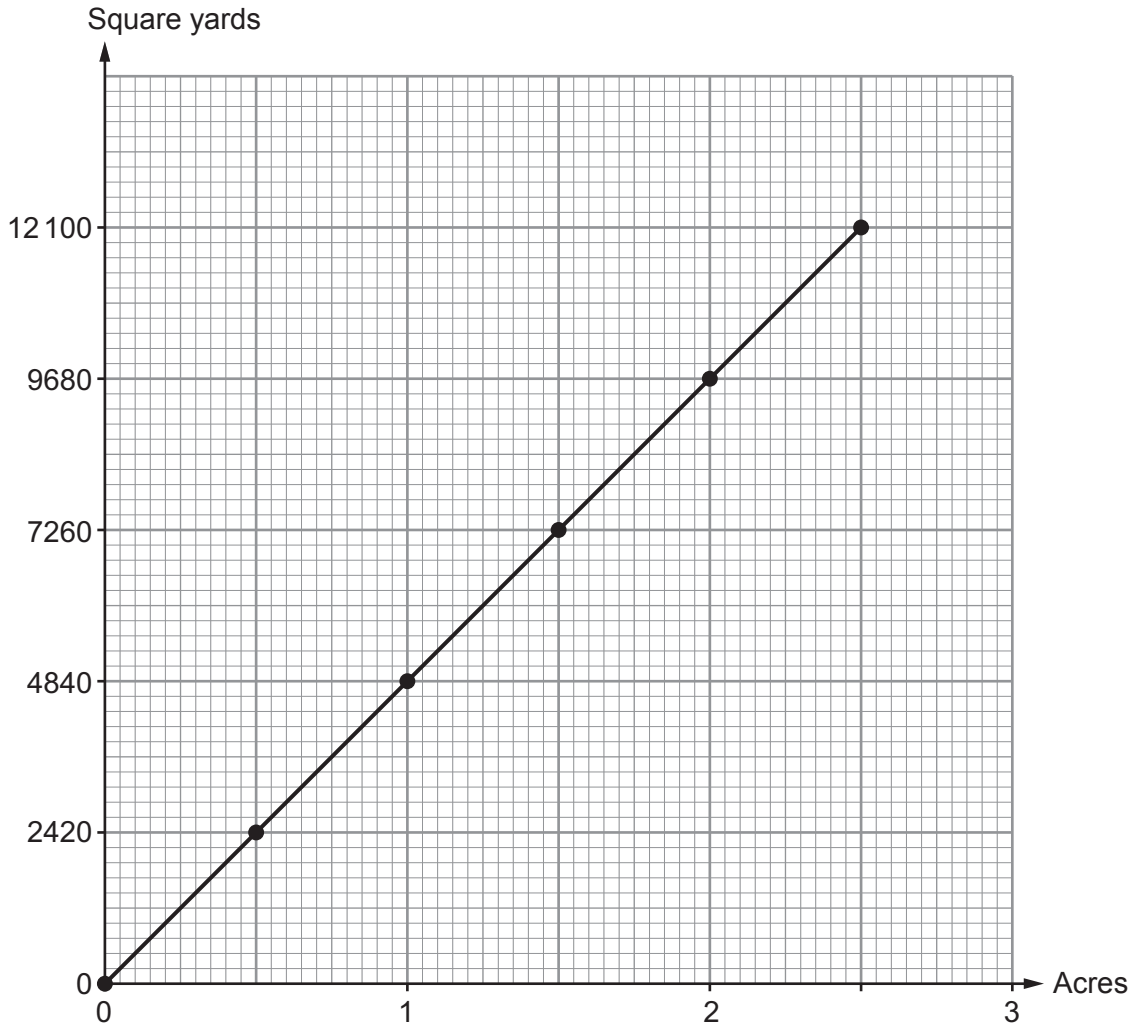
5. Marcus is a farmer.
He has his own conversion graph to change between acres and square yards.



Complete each of the following statements.

(a) 3 acres is equal to 14 520 square yards. [1]

From the graph: 2.5 acres = 12 100 square yards, 0.5 acres = 2420 square yards

3 acres = 2.5 acres + 0.5 acres

= 12 100 + 2420 = 14 520 square yards

(b) 5·5 acres is equal to 26 620 square yards. [2]

5.5 acres = 2.5 acres + 3 acres

= 12 100 + 14 520

= 26 620 square yards

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6.

Small bottle
300 ml for 66p

Medium bottle
400 ml for 92p

Large bottle
500 ml for £1.25

(a) Roland is going to buy some orange juice for a party.
Which size bottle of orange juice offers the best value for money?
You must show your working. [3]

Compare the cost of 100 ml for each size:

Small: 66p ÷ 3 = 22p per 100 ml

Medium: 92p ÷ 4 = 23p per 100 ml

Large: £1.25 = 125p, 125p ÷ 5 = 25p per 100 ml

22p < 23p < 25p

The small (300 ml) bottle is the best value for money.

(b) Galina needs to buy **exactly** 800 ml of orange juice.
Which is the best option for Galina?
You must show your working and consider all options.
You must give a reason for your choice. [3]

Two medium bottles: 400 + 400 = 800 ml, cost = 2 × 92p = 184p = £1.84

One small + one large: 300 + 500 = 800 ml, cost = 66p + £1.25 = £1.91

No other mix gives exactly 800 ml (e.g. 300 + 300 = 600 ml, 500 + 500 = 1000 ml).

Best option: two medium bottles, because £1.84 is cheaper than £1.91.

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7. A survey was carried out to find how often teenagers buy DVDs.

The following two questions were asked in a questionnaire.

Q1. Where do you live?

Q2. How often do you buy DVDs?

Never	1-10 times	10-15 times	More than 15 times
☐	☐	☐	☐

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

Q1. It is not relevant to how often you buy DVDs (and it is too personal).

Q2. The options overlap (10 is in two boxes) and no time period is given.

(b) The survey was carried out by leaving copies of the questionnaire on the DVD shelves in a supermarket.

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

It does not target teenagers. Only people who visit the DVD shelves in that supermarket will see it, so the sample is biased and many teenagers will never be asked.

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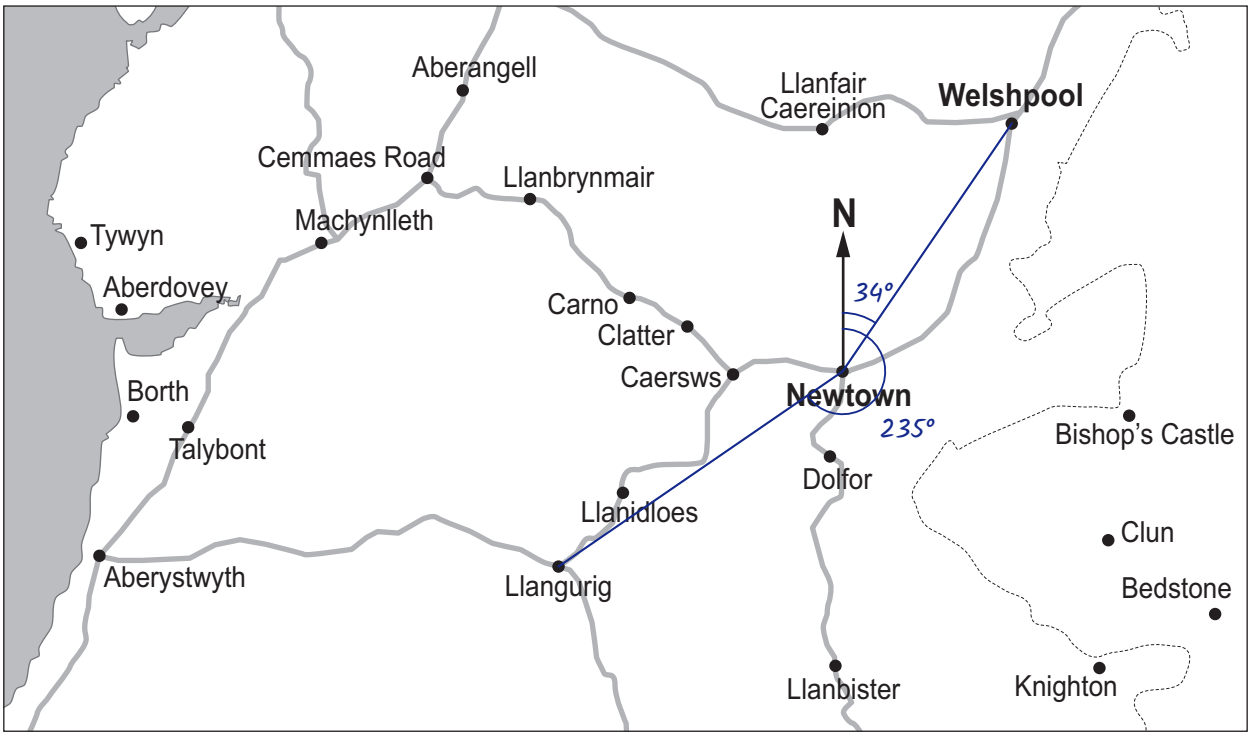
8. The map shows a part of Wales.
The position of Newtown is shown on the map.



(a) Write down the bearing of Welshpool from Newtown. [1]

034 °

(b) Name the place on the map that is on a bearing of 235° from Newtown. [2]

Llangurig

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(c) The distance from Newtown to Welshpool is approximately 14 miles by road.

(i) **Estimate** the distance by road from Welshpool to Llanfair Caereinion in miles. [1]

Newtown to Welshpool ≈ 4 cm on the map = 14 miles, so 1 cm ≈ 3.5 miles

Welshpool to Llanfair Caereinion ≈ 2.5 cm, 2.5 × 3.5 ≈ 9 miles

9 miles

(ii) Megan lives in Cemmaes Road.
To travel to work, she starts by heading towards Machynlleth.
Her journey to work is approximately **40 km**.

Convert 40 km to miles. [2]

8 km ≈ 5 miles

40 km = 5 × 8 km, so 40 km ≈ 5 × 5 miles

40 × 5 ÷ 8 = 25 miles

25 miles

In which town or village could Megan work? [1]

Aberystwyth

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9. *(a)* Students are taking tests in English and Welsh.
The English test is marked out of 80.
The Welsh test is marked out of 70.

(i) Dyfed scores 35 in his English test.
Estimate Dyfed's score as a percentage.
Circle your answer. [1]

4% 20% 23% 44% 51%

35 out of 80 is a bit less than 40 out of 80 = 50%, so about 44%

(ii) Liam scores 22 in his Welsh test.
Estimate Liam's score as a percentage.
Circle your answer. [1]

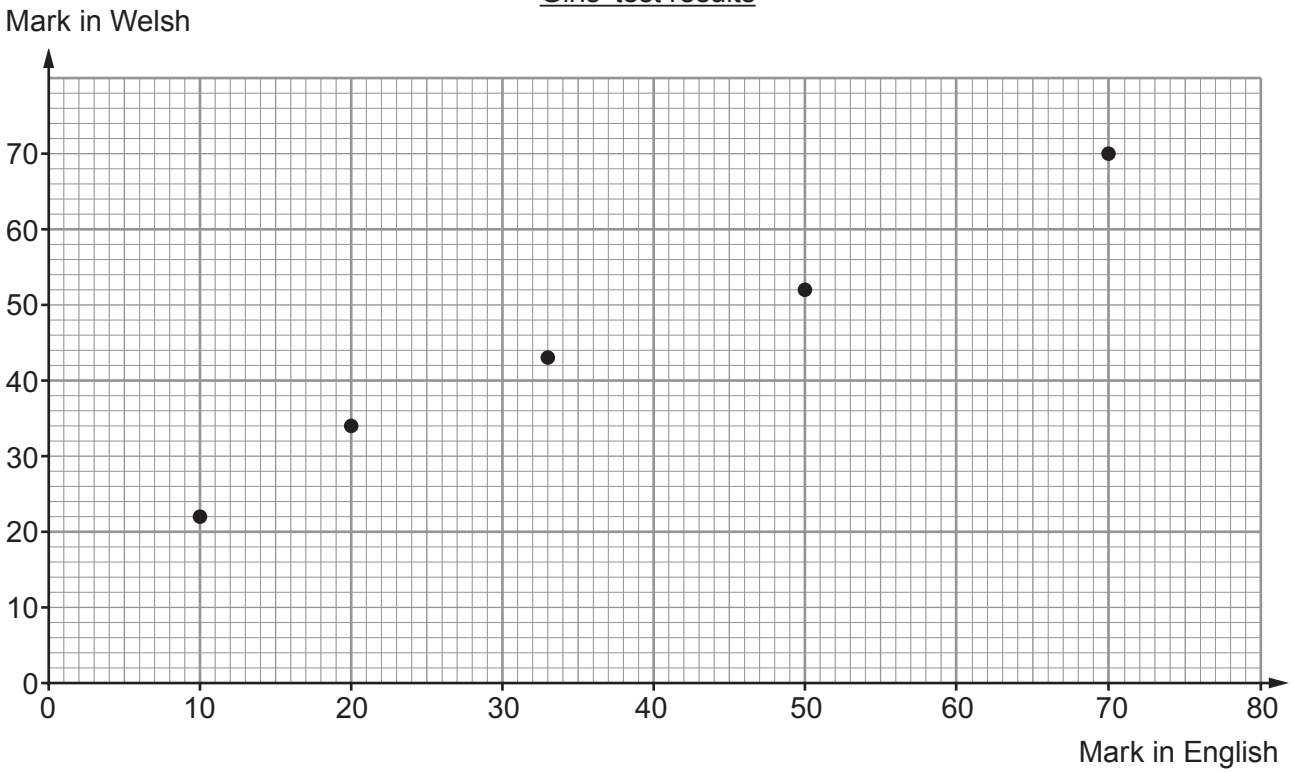
0·3% 3% 22% 31% 40%

22 out of 70 ≈ 21 out of 70 = 3 out of 10 = 30%, so about 31%

(b) Rowena states a hypothesis,
'Boys do better than girls in their English tests.'

She displays the test marks for 5 girls and 5 boys in scatter diagrams.

Girls' test results



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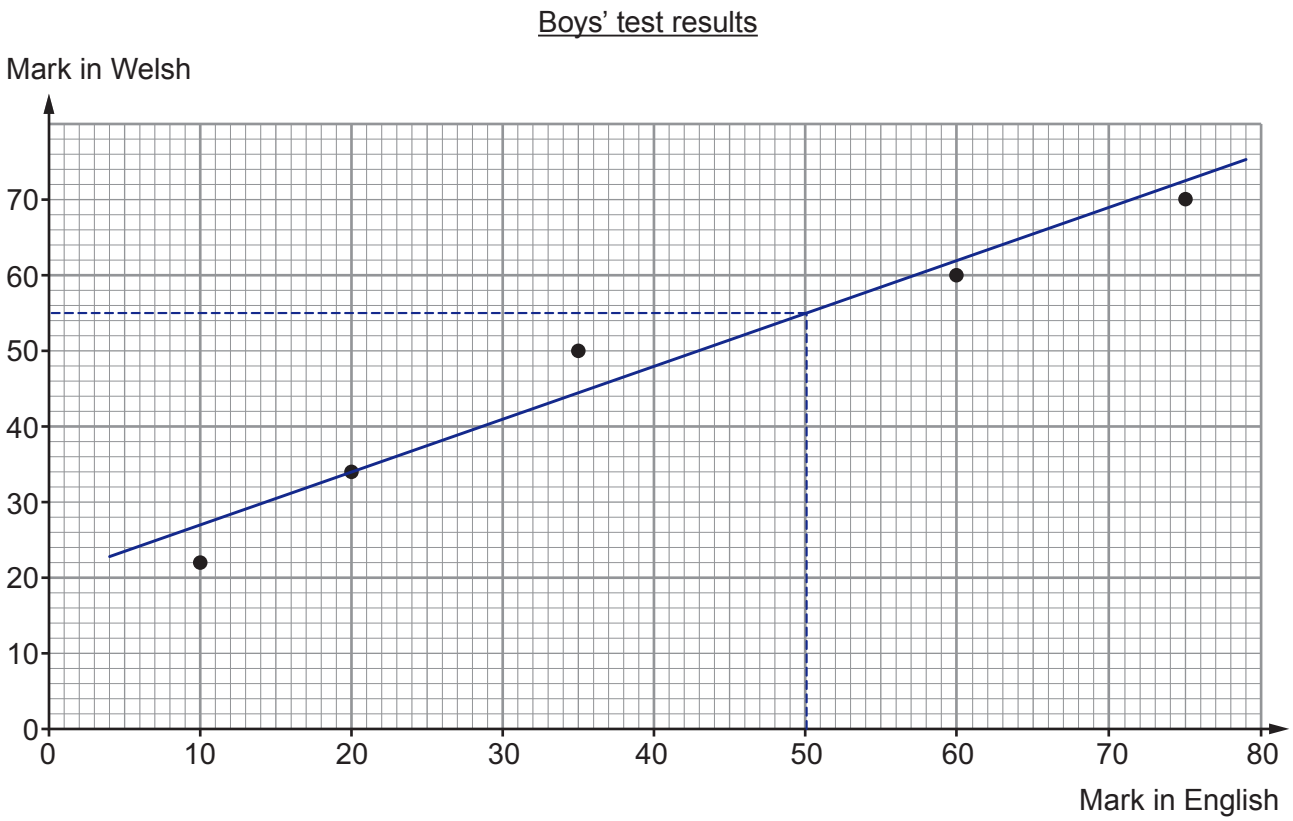

(i) Does the data support Rowena's hypothesis?
You must give a reason for your answer. [1]

Yes. The first two boys and girls have the same marks in English (10 and 20), but the other 3 boys scored more in English than the other 3 girls (boys 35, 60, 75 compared with girls 33, 50, 70). So the boys did better in their English tests.

(ii) How could Rowena improve the testing of her hypothesis? [1]

Collect more data: test many more boys and girls (a bigger sample).

(c) Draw, by eye, a line of best fit to estimate how many marks you might expect a **boy** to score in a Welsh test if he scored 50 marks in his English test. [2]

55 marks

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10. Marcin has a market stall to sell his printed T-shirts.

It costs him:
- £250 to buy 100 **plain** T-shirts,
- 50p to print a design on each T-shirt.

Marcin sells his printed T-shirts for £4.00 each.

At the start of the week:
- His bank account balance is £820.
- Marcin has 100 printed T-shirts ready to sell.
- He has already paid for these printed T-shirts.

During the week:
- Marcin sells his stock of 100 T-shirts.
- He pays all the money he takes from selling T-shirts into his bank account.
- He buys and prints another 400 T-shirts.
- Marcin **does not** sell any of these 400 T-shirts.

How much will Marcin have in his bank account at the end of this week?
You must show all your working. [4]

Money from selling 100 T-shirts = 100 × £4 = £400

Bank balance after paying this in = £820 + £400 = £1220

Cost of 400 plain T-shirts = 4 × £250 = £1000

Cost of printing 400 T-shirts = 400 × 50p = 20 000p = £200

Total spent = £1000 + £200 = £1200

Bank balance at the end of the week = £1220 − £1200 = £20

Marcin will have £20 in his bank account.

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11. When it is 21:30 on a Tuesday in London, it is 02:30 on a Wednesday in Dhaka, Bangladesh.

It takes 10 hours 30 minutes to fly from Dhaka to London.
A flight leaves Dhaka on Thursday at 13:00 local Dhaka time.

On what day and at what time should this flight arrive in London?
Give your answer in local London time. [4]

Time difference: 21:30 London = 02:30 Dhaka, so Dhaka is 5 hours ahead.

Leaves Dhaka Thursday 13:00 Dhaka time

In London time it leaves at 13:00 − 5 hours = 08:00 Thursday

Arrival = 08:00 + 10 hours 30 minutes = 18:30

(Check: 13:00 + 10 h 30 min − 5 h = 18:30)

The flight arrives in London on Thursday at 18:30 London time.

Arrival in London:

Day Thursday Time 18:30

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