Surname	Centre Number	Candidate Number
Other Names		0

GCSE – NEW

3310U20-1

S17-3310U20-1

MATHEMATICS – NUMERACY
UNIT 2: CALCULATOR-ALLOWED
FOUNDATION TIER

THURSDAY, 8 JUNE 2017 – MORNING

1 hour 30 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**7**	
2.	**13**	
3.	**13**	
4.	**3**	
5.	**3**	
6.	**3**	
7.	**2**	
8.	**3**	
9.	**3**	
10.	**5**	
11.	**4**	
12.	**6**	
Total	**65**	

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, taking care to number the question(s) correctly.

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.

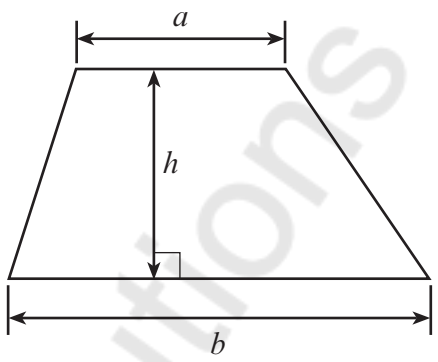
Scale drawing solutions will not be acceptable where you are asked to calculate.

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

In question **3***(d)*, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

Formula List - Foundation Tier

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



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1. The chart below shows the road distances between some towns and cities.
The distances are given in miles.

Abergavenny			
18	**Newport**		
45	53	**Gloucester**	
50	32	36	**Bristol**

45 miles
36 miles
81 miles

Wyn lives in Abergavenny and works in Bristol.

(a) Use the chart to find the road distance from Abergavenny to Bristol. [1]

50miles

(b) Wyn works in Bristol for 5 days each week.
Each day, he drives to and from work using the route shown on the map.

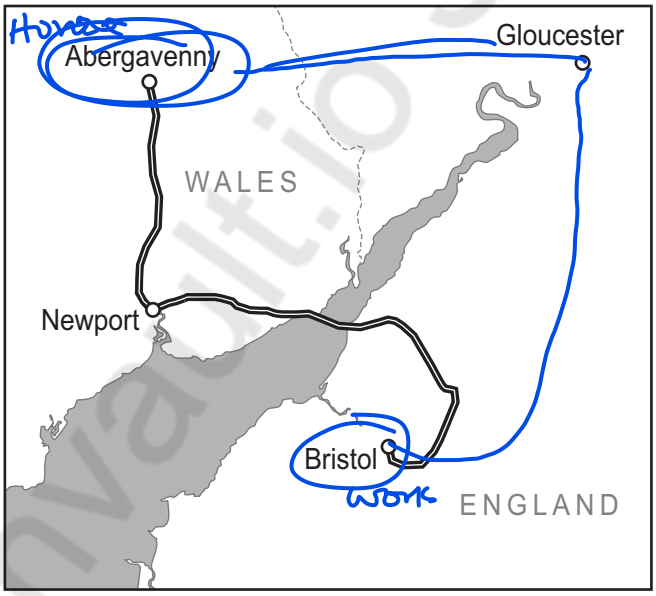

Diagram not drawn to scale

How many miles, in total, does he travel to and from work each week? [2]

To work: Distance from Abergavenny – Bristol = 50miles
To home: Distance from Bristol – Abergavenny = 50miles
Total Distance to and from is 100miles
By the five days = 100 x 5
= 500miles

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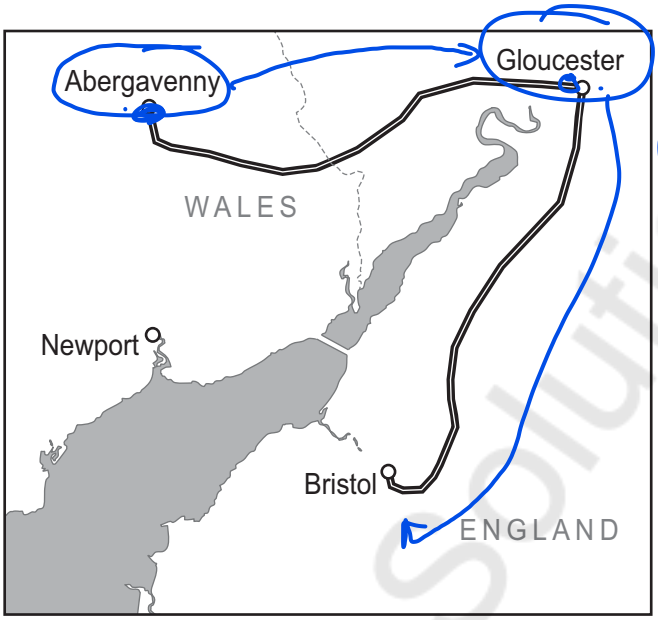
(c) One day, Wyn had to use a different route through Gloucester to get to and from work.

Alternative Route



Route

Diagram not drawn to scale

Use the chart to work out how many **extra** miles Wyn travelled that day.
You must show all your working. [4]

Normal Distance for One day = 100 miles

Total distance using Gloucester is 81 x 2 = 162 miles

Extra miles = 162 − 100 = 62 miles

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2. *(a)* David and Gwyn have decided to take part in a charity running event.
They both ordered some new running kit from an online discount store.

A pair of trainers	A pair of socks	A pair of leggings
 £39.99	 £2.99	 £12.90
A running vest	**A pair of shorts**	**A water bottle**
 £15.50	 £11.98	 £6.00

(i) David ordered the following items:

- 1 pair of trainers,
- 2 pairs of shorts,
- 3 pairs of socks.

What was the total cost of these items?
You must show all your working. [3]

1 pair of trainers = £39.99
2 pairs of shorts = 11.98 x 2 = 23.96
3 pairs of socks = 2.99 x 3 = 8.97
£72.92

Examiner only

(ii) The discount store has a delivery charge of £6.99 for all orders under £100.
For all orders of £100 or over, delivery is free.
Gwyn calculated that the cost of the items in his order would be £96.62.

Explain how Gwyn would actually save money by adding two pairs of socks to his order.

You must show all your working. [3]

ordering < £100 Delivery £6.99
ordering ≥ £100 Delivery free

Gwyn order ⟶ £96.62

Since Gwyn order is less than £100, he will pay for delivery

Total cost ⟶ £96.62 + 6.99 = £103.61

2 pairs of socks cost = 2.99 × 2 = £5.98

New total cost ⟶ £96.62 + £5.98

⟶ £102.6

Since, the new cost ≥ £100, Then Gwyn won't pay delivery fee.

So, he will pay £102.60 ✓

So, ~~Gwyn~~ Gwyn has saved

£103.61 — £102.60

£1.01

If he didn't buy the socks, the delivery charge would apply which is more than the cost of buying the socks.

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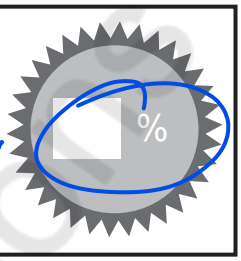
(b) David aims to raise £200 for his chosen charity.
He set up a "Sponsor me please" page on social media.
This is David's page at the end of the first week.
The percentage has been blanked out.

David's Page
David is raising money for a charity.
Please help him to reach his target of £200.

Donate

Current total raised £32.00



(i) How much more money did David need in order to reach his target? [1]

Amount remain = £200 − £32 = £168

(ii) David thought he had raised more than 15% of his target.
Was he correct?
Show your working. [2]

Percentage raised = $\frac{\text{raised}}{\text{Actual value}} \times 100$

% raised = $\frac{32}{200} \times 100 = 16\%$

Yes, David has raised more than 15% of his target

(iii) After two weeks, David had raised 57% of his target.
What percentage of his target was still to be raised? [1]

% raised = 57%

Amount raised = 57% of target

$= \frac{57}{100} \times 200 = £114$

Amount left raised = £200 − £114 = £86

% of target left to raised = $\frac{86}{200} \times 100$

$= 43\%$

Examiner only

(c) David and Gwyn kept a training record as they prepared for the charity event.
They recorded the number of miles that they ran each day.
The mileage for week one is shown below.

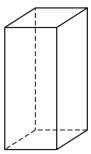
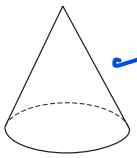
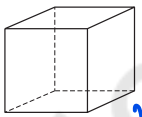
	Mon	Tue	Wed	Thur	Fri	Sat	Sun
David	1	8	2	1	7	1	5
Gwyn	1	4	1	6	2	1	12

Gwyn thinks that his average daily mileage is greater than David's.
Explain why using the **medians** would not show this.
You must show all your working. [3]

Median
David : 1 1 1 2 5 7 8
median = 2
Gwyn : 1 1 1 2 4 6 12
median = 2
median for both david and Gwyn is equal
Thus, median doesn't show if Gwyn average is greater than David's

Examiner only

3. Delyth runs her own business making and selling candles.
She makes and sells four types of candle.

Type	Picture of candle	Diagram	Name of the 3-D solid	Volume of candle (cm^3)
A			Rectangular Prism or Cuboid	240
B			Cylinder	283
C			CONE	270
D			CUBE	120

(a) Fill in the names of the 3-D solids in the table above. A. Cuboid B. Cylinder [2]

(b) Delyth uses a formula to work out the mass of wax that is needed to make one candle.

$$\text{Mass of wax in grams} = \frac{3 \times \text{volume of candle}}{5}$$

(i) What mass of wax will be needed to make a candle of type C? [2]

mass of wax = $\frac{3 \times \text{volume of candle}}{5}$

mass of type C = $\frac{3 \times 270}{5} = 162$ grams

Mass of the wax of a candle of type C is 162 grams

(ii) Delyth has enough wax to make 50 candles of type A.
How many type D candles can she make with the same amount of wax? [2]

He wanted make 50 candle of type A

mass of type A = $\frac{3 \times 240}{5} = 144$ grams

1 candle of type A → 144 grams

50 candles of type A → 7200 grams

Answer: 100 candles of type D

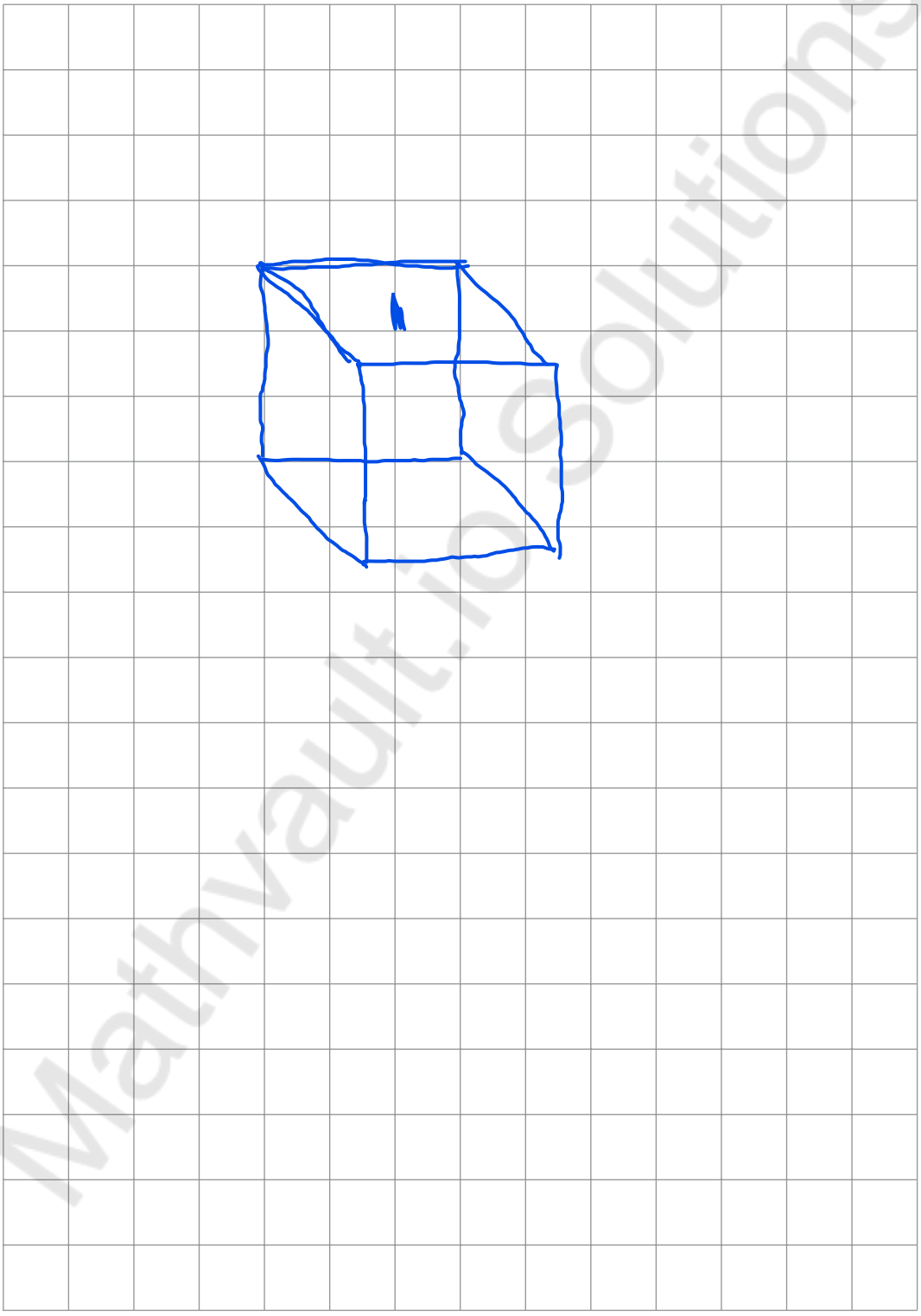
mass of type D = $\frac{3 \times 120}{5}$ = 72 grams

1 candle of type D = 72 grams $\times 100$

100 candles of type D = 7200 grams

Examiner only

(c) Delyth also makes small candles.
One of these candles fits in a box with a lid.
The box is a cube with sides of length 3 cm.
Use the centimetre squared paper to draw a net of the box, including the lid. [2]



Examiner only

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

It costs Delyth £2.35 to make each small candle.
It costs 15p to make each box.

Delyth sells 20 candles, each in a separate box, for a total of £84.
How much profit does Delyth make?
You must show all your working. [3 + 2 OCW]

Cost of candle = £2.35 | candle

Cost of box = £0.15 | box

Selling Price = £84 for 20 candle & box

Cost of candle and box = £2.35 + £0.15
= £2.50

Cost of 20 candle and box = £2.50 × 20
= £50

Profit = Selling Price − Cost Price

Profit = £84 − £50

Profit = £34

Examiner only

4.

Bus timetable from Orme Station to Outlet Village

Only 55 minutes from Orme Station direct to Outlet Village.

Buses leave the station
- every 12 minutes from 8 a.m. until 12 noon
- every 24 minutes from 12 noon until 10 p.m.

(a) At what time does the first bus after 09:00 leave Orme Station?
Circle your answer. [1]

09:05 09:12 09:18 09:24 09:30

8am → 8:12 → 8:24 → 8:36 → 8:48 → 9:00 → 9:12 → 9:24

(b) Gwil looks at the timetable shown above.
He decides to take the latest possible bus to be at Outlet Village by 15:00.

At what time will Gwil arrive at Outlet Village?
You must show all your working. [2]

every 24 mins bus leaves | 55 minute to get to outlet

First Bus Leave 12:00 noon | Get to Outlet 12:55pm
Second Bus leaves 12:24 pm | Get to outlet 13:19pm
Third Bus leaves 12:48 pm | Get to outlet 13:43pm
Fourth Bus leaves 13:12pm | Get to outlet 14:17pm
Fifth Bus leaves 13:36pm | Get to outlet 14:31pm
Six Bus leaves 14:00pm | Get to outlet 14:55pm
7th Bus leaves 14:26pm | Get to outlet 15:21pm

14:26 + 55 = 14:80 = 21

The latest possible at Orme is 14:00 he will arrived Outlet at 14:55

2

Examiner only

5. Luigi lives in south Wales.
Rosina lives in west Wales.
For each of the first 65 days of 2017, they recorded whether or not it rained.

Luigi recorded that it rained on 28 of these days.
Rosina recorded that it rained on 40% of these 65 days.

Luigi says,

> 'For the first 65 days of 2017, there were more days with rain where I live than where Rosina lives.'

Is Luigi correct?
You must show all your working. [3]

Luigi recorded rained → 28 times
Rosina recorded rained → 40% of 65 days

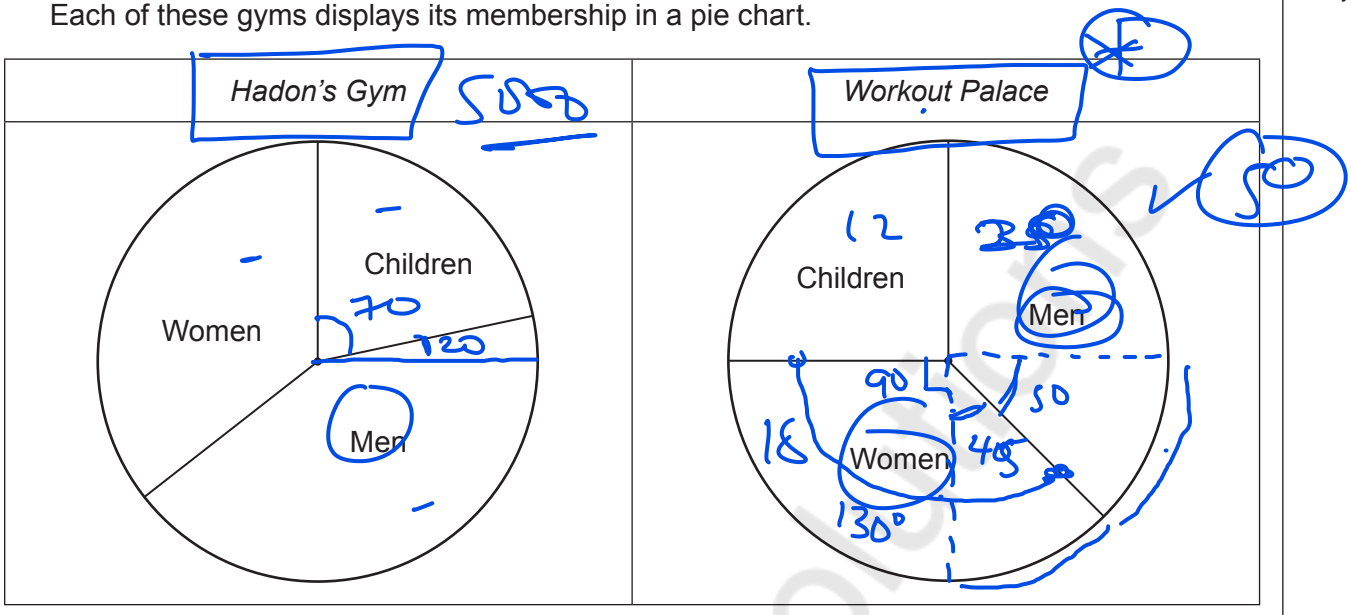
40% of 65 = $\frac{40}{100} \times 65 = 26$ days

Luigi Side, it rained 28 times
Rosina Side, it rained 26 times

Yes, Luigi is correct since 28 is greater than 26.

Examiner only

6. Tomos is looking at gym memberships for *Hadon's Gym* and *Workout Palace*.
Each of these gyms displays its membership in a pie chart.



(a) About what percentage of the members at *Hadon's Gym* are children?
Circle your answer. [1]

10% 20% 30% 40% 50%

% of children $= \frac{70}{360} \times 100 = 19.44\%$

$= 20\%$

(b) Which of the following is the best estimate for the percentage of the members at *Workout Palace* who are women?
Circle your answer. [1]

25% 28% 30% 32% 38%

% of women $= \frac{130}{360} \times 100 = 36.11\%$

estimate value $= 38\%$

(c) Tomos says,
'There are more men with membership at *Hadon's Gym* than at *Workout Palace*.'

Is Tomos **certain** to be correct?
You must give a reason for your answer. [1]

Yes ☐ No ☑

We don't know the total membership of each gym.

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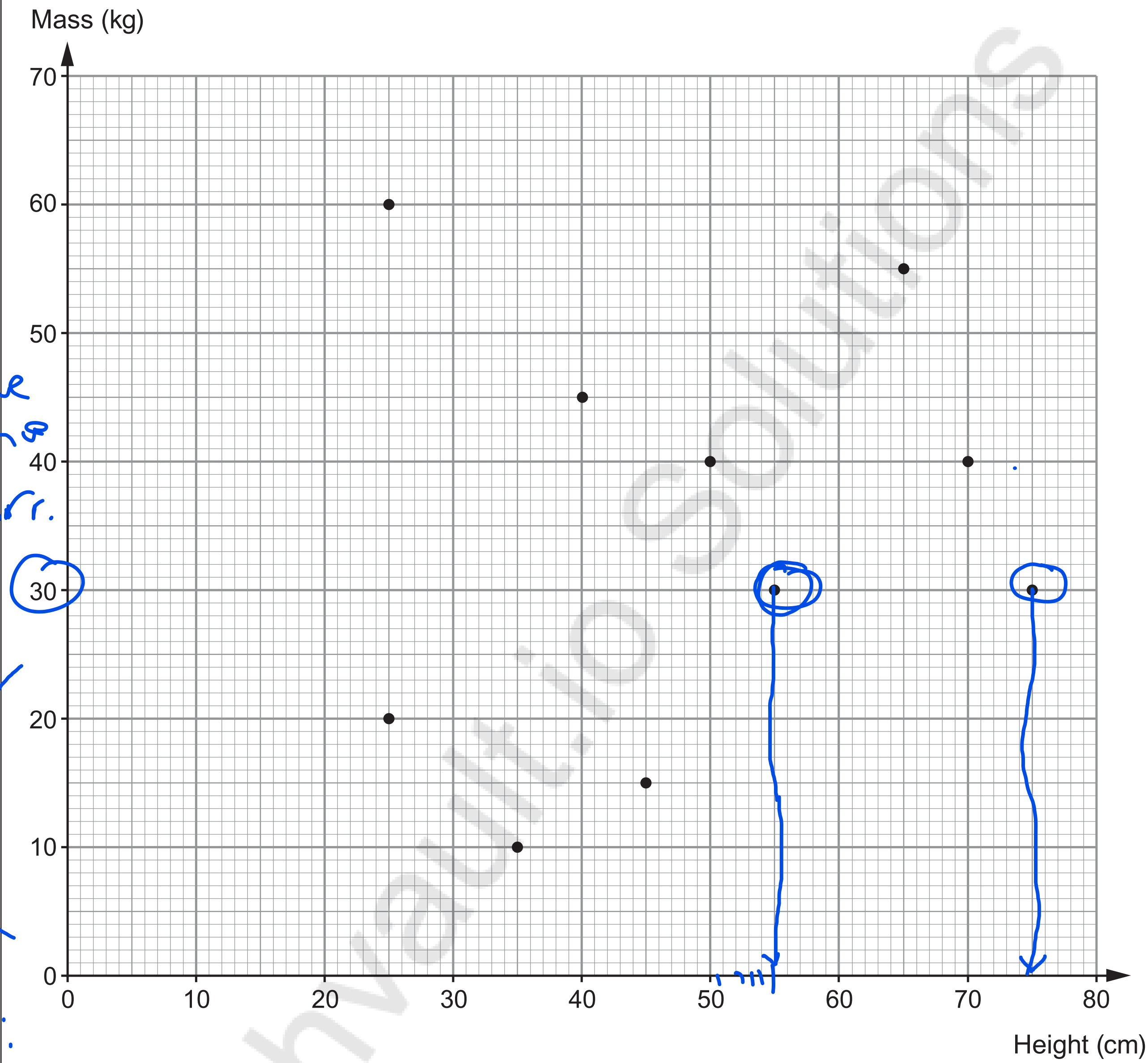
7. A group of friends measured the heights and masses of their pets.
The scatter diagram shows the results.



(a) Describe the correlation shown by this scatter diagram. [1]

No correlation

(b) The friends notice that the tallest pet has the same mass as another pet.
What is the height of this other pet? [1]

55 cm

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Examiner only

8. Glenda plans to drive from Flint to Cardiff.

On a long journey, her average speed is usually 42 mph.

Last time she drove from Flint to Cardiff it took her $3\frac{1}{2}$ hours.

(a) Use this information to calculate the distance between Flint and Cardiff. [2]

A·S = 42 mph t = 3·5 h

A·S = $\frac{D}{t}$

D = A·S × t = 42 × 3·5 = 147 miles

147 ..... miles

(b) Give a possible reason why your answer in *(a)* is only an estimate of the distance between Flint and Cardiff. [1]

A·S = $\frac{\text{Total Distance}}{\text{Total Time taken}}$

The time might actually not be 3½ hours due to traffic or stopping along the way.

D = A·S × t

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9. Gustav is making some scones for his sister's birthday party.

Recipe to make 12 scones

450 g self raising flour
2 teaspoons of baking powder
75 g butter
50 g caster sugar
2 eggs
225 ml milk

Bake at **428°F** for 10 to 15 minutes

12 scones → 450 g
1 scone = 37.5 g
30 scone = 1125 g

(a) How much self raising flour will Gustav need to make 30 scones?
Circle your answer. [1]

900 g 1000 g 1100 g **1125 g** 1350 g

1 scone = 37.5 g; 30 scones = 37.5 × 30 = 1125 g

(b) In the recipe, the temperature of the oven is given in degrees Fahrenheit, *F*.
The temperature gauge on Gustav's oven shows degrees Celsius, *C*.

The formula below is used to convert Fahrenheit into Celsius.

$$C = \frac{5F - 160}{9}$$

At what temperature should Gustav bake the scones?
Give you answer in degrees Celsius. [2]

°F = 428°F

$°C = \frac{5F - 160}{9} = \frac{5 \times 428 - 160}{9} = \frac{2140 - 160}{9}$

$= \frac{1980}{9}$

$= 220°C$

220 °C

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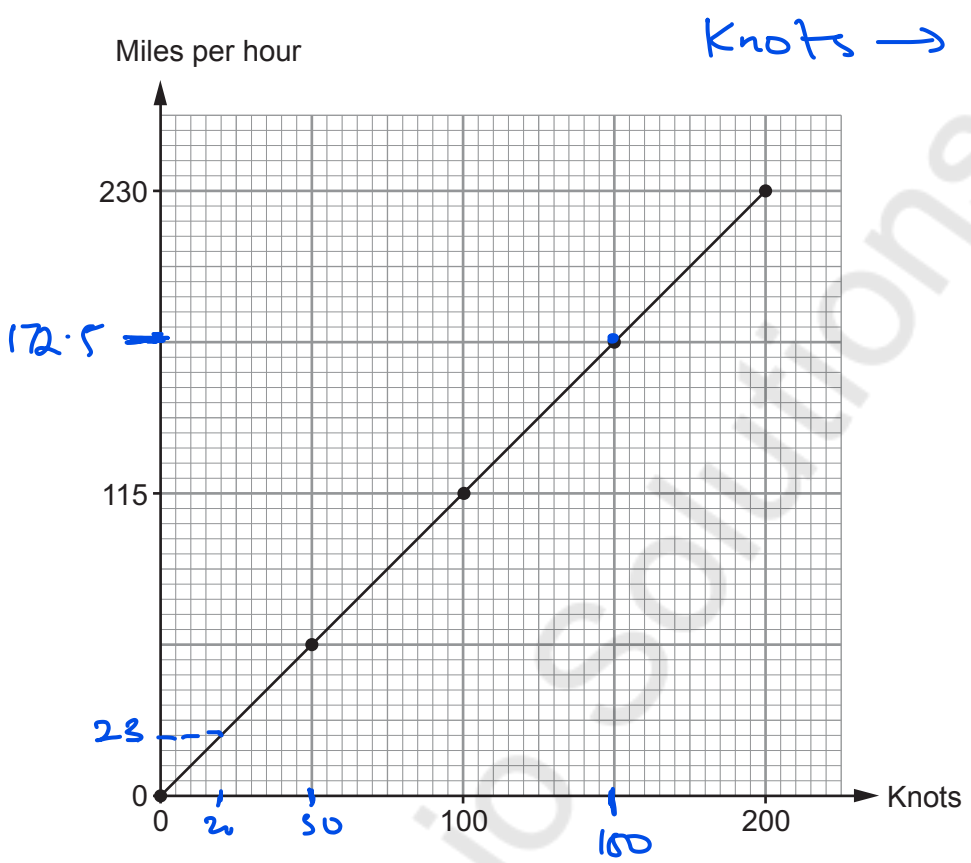
Examiner only

10. Alun has made his own conversion graph to change knots to miles per hour.



(a) Use Alun's conversion graph to write 150 knots in miles per hour. [1]

150 knots → 172·5 miles per hour

Examiner only

(b) Nikita thinks Alun's conversion graph may be inaccurate.

Nikita knows that 1000 knots is 1150.779 miles per hour, correct to 3 decimal places.

Convert 20 knots to miles per hour
- using Alun's conversion graph, and then
- using Nikita's values.

Calculate the difference, in miles per hour, between your answers.
Give your answer correct to 2 decimal places.
You must show all your working. [4]

Nikita's claim → 1000 knots = 1150.779 mph

20 knots = 23.01558 mph

Alun's graph → 20 knots = 23 mph

Difference = 23.01558 − 23

= 0.01558 mph

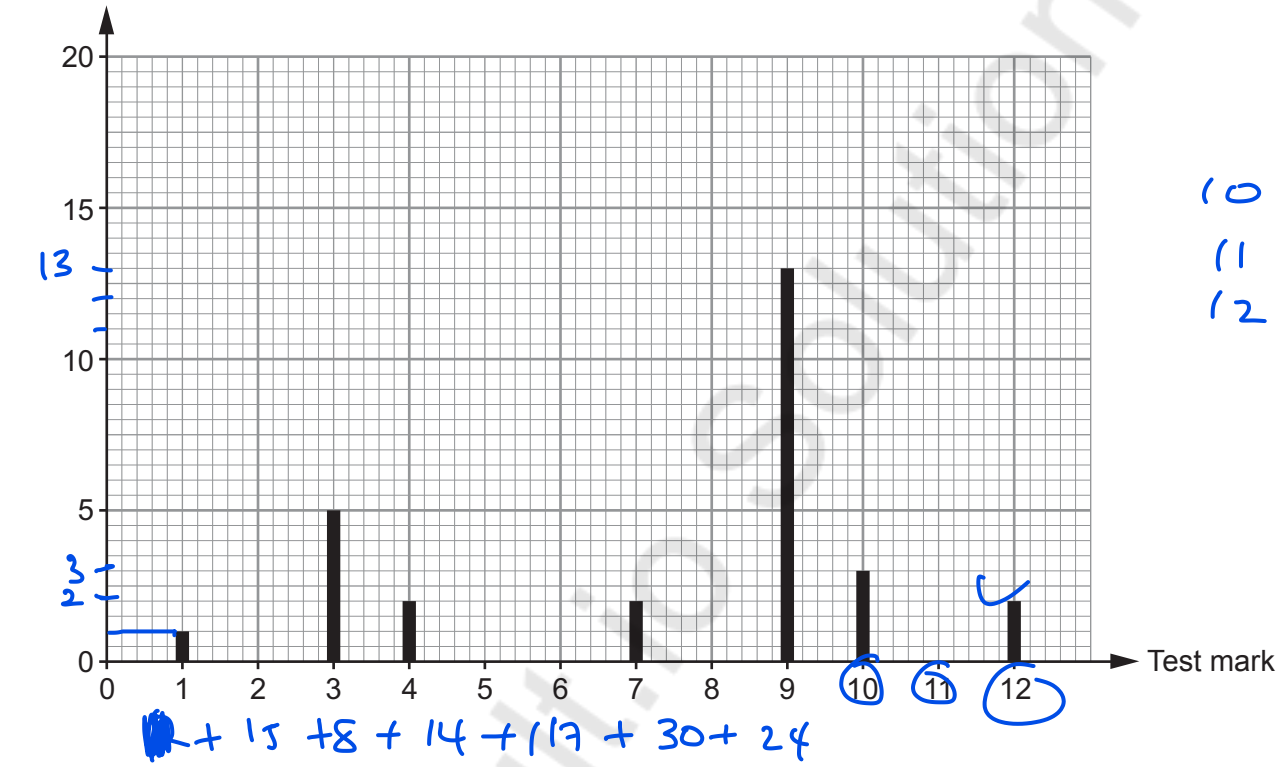
= 0.02 mph //

Examiner only

11. *(a)* Miss Rashud gave her Year 9 French class a test on Wednesday.
She asked her class to spell 12 different words.

She displays the results as shown below.

Year 9 results



1 + 15 + 8 + 14 + 17 + 30 + 24

(i) How many pupils scored **more than 9** in the test? [1]

3 + 0 + 2 = 5 pupils

(ii) How many pupils are there in Miss Rashud's French class? [1]

28 pupils

Total pupils = 1 + 5 + 2 + 0 + 0 + 2 + 0 = 13 + 3 + 0 + 2 = 28

(iii) What assumption have you made in answering part (ii)? [1]

we assume all pupils were present for the test on wednesday and they took the test.

(b) Miss Rashud also gave the same test to her Year 10 French class on Wednesday.
She asked her class to spell the same 12 words.

She displays the results as shown opposite.

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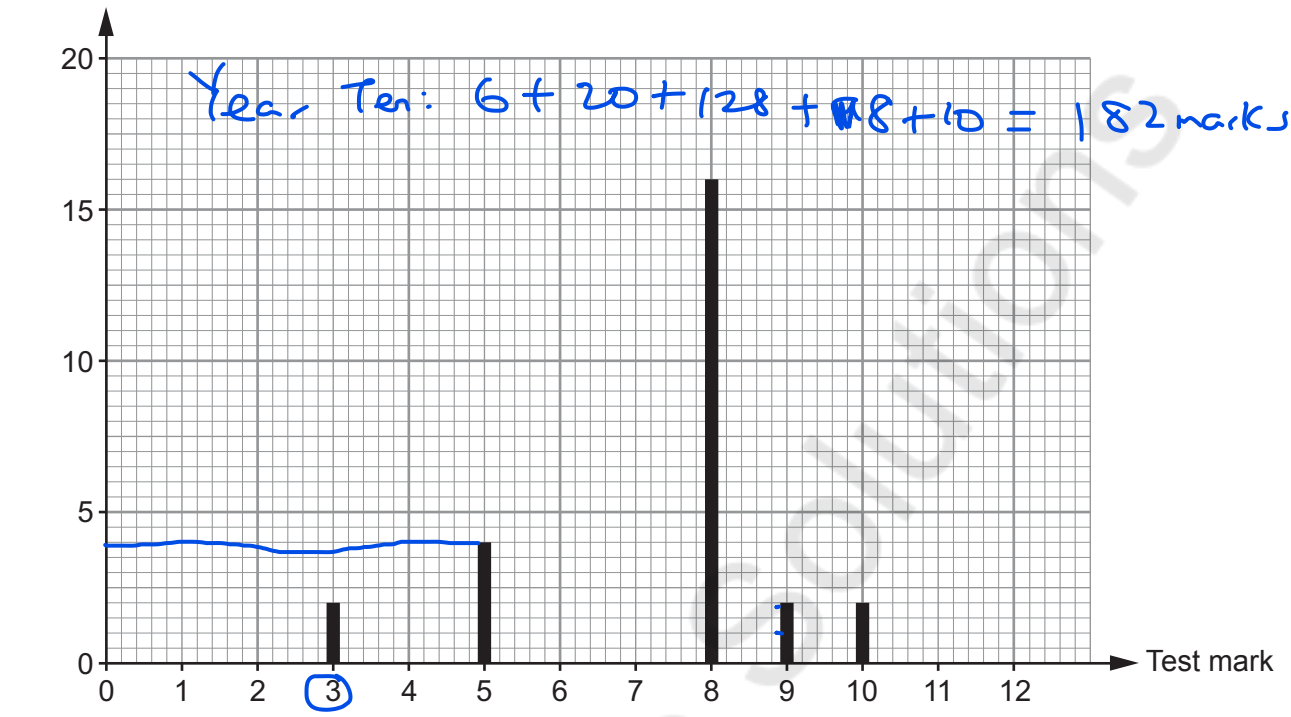
Year 10 results



Year Ten: 6 + 20 + 128 + 18 + 10 = 182 marks

Catrin looks at the two sets of data Miss Rashud has displayed.
She says,

'Year 10 are better at spelling than Year 9.'

Year ten = 182 marks

Year Nine = 209

Is Catrin's statement correct?
You must give values to support your answer. [1]

Catrin is correct ☐ Catrin is incorrect ☒

Since the total score of Year 9 is greater than the total score of year 10.

Year nine (209) > Year ten (182)

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12. *Organics4U* is a company based in Wales that delivers organic products.
Organics4U has 16 vehicles on the road every working day.
The company has 6 vans and 10 trucks.

Ffion has the following information for each type of vehicle.

Type of vehicle	Average distance travelled per litre (km per litre)	Average distance travelled per day (km per day)
Van	8	256
Truck	5·5	704

The fuel used by all of the 16 vehicles costs £1.10 per litre.
Use this information to calculate the **total** fuel bill for 1 working day.
You must show all your working. [6]

Van → 8 km / litre 256 km / day
Truck → 5.5 km / litre 704 km / day
Cost of fuel → £1·10 per litre
Van → 6 Truck → 10
Van → 256 km in a day
8 km → 1 litre ×32
256 km → 32 litre
6 Van will need = 6 × 32 = 192 litre

Truck → 704 km → 1 day
5.5 km → 1 litre ×128
704 km → 128 litre
10 Trucks will need = 10 × 128 = 1280 litres

Total litre used in a day = 1280 + 192 =
= 1472 litre

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Cost of fuel £1·10 per litre
Therefore, 1472 litres = 1·1 × 1472
= £1619·20

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