Surname	StemUp Model Solution	Centre Number	Candidate Number
Other Names			0

GCSE

3310U20-1

S18-3310U20-1-R1

MATHEMATICS – NUMERACY
UNIT 2: CALCULATOR-ALLOWED
FOUNDATION TIER

THURSDAY, 10 MAY 2018 – MORNING

1 hour 30 minutes

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 the 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 **5**, 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.	**4**	
2.	**5**	
3.	**3**	
4.	**5**	
5.	**7**	
6.	**8**	
7.	**6**	
8.	**4**	
9.	**6**	
10.	**4**	
11.	**7**	
12.	**6**	
Total	**65**	

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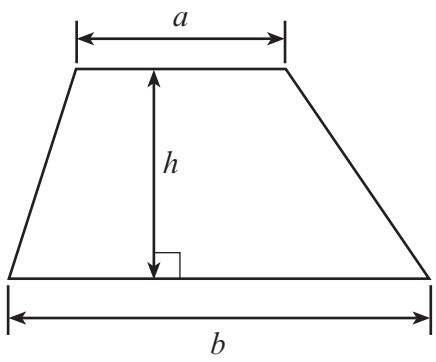
Formula List - Foundation Tier

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



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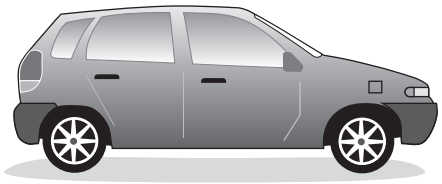
1.



In April 2017, Matthew bought a second-hand car.
Exactly one year later, in April 2018, Matthew sold the car.

(a) When Matthew bought the car, the mileage was 52 907.

5	2	9	0	7

When Matthew sold the car, the mileage was 61 814.

6	1	8	1	4

How many miles did Matthew's car travel in the year? [1]

61 814 − 52 907

= 8907 miles

(b) In April 2018, Matthew bought a new car.
Matthew thinks he will drive about the same number of miles each year as he did in his old car.
Use your answer to part *(a)* to estimate the number of miles that Matthew's new car will travel in 3 years.
Give your answer correct to the nearest thousand miles. [3]

Miles in 3 years = 8907 × 3

= 26 721 miles

To the nearest thousand:

27 000 miles

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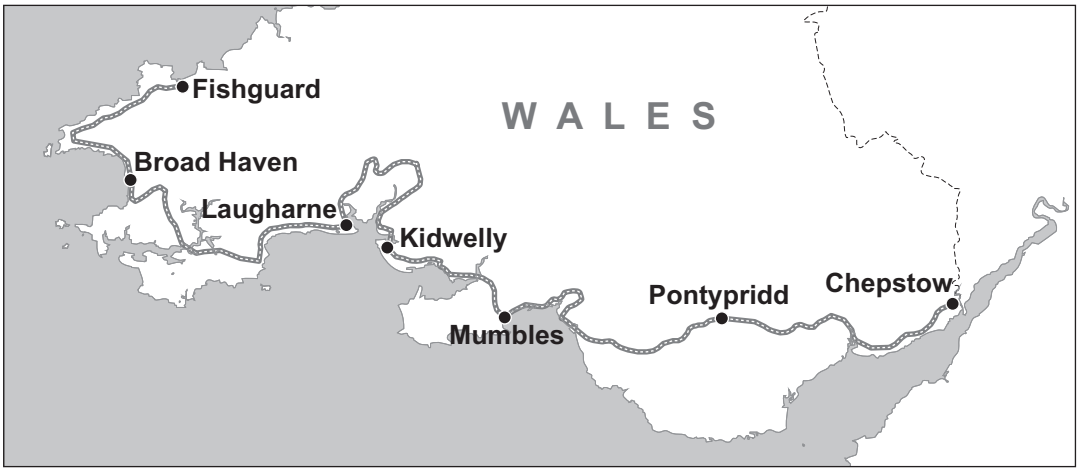
2. The Celtic Trail is part of the UK National Cycle Network.



(a) Arfon plans a cycle tour on the Celtic Trail from Fishguard to Chepstow.
The route is split into stages.

Stage	Starting from	Going to	Distance (miles)
1	Fishguard	Broad Haven	36
2	Broad Haven	Laugharne	46
3	Laugharne	Kidwelly	32
4	Kidwelly	Mumbles	29
5	Mumbles	Pontypridd	40
6	Pontypridd	Chepstow	44

(i) What is the total distance that Arfon plans to cycle? [1]

36 + 46 + 32 + 29 + 40 + 44

= 227 miles

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(ii) Arfon plans to take 3 days for his cycle tour.
He cannot cycle further than 85 miles in one day.

Complete the table to show how Arfon could plan his route from Fishguard to Chepstow. [2]

Day	Starting from	Going to	Distance (miles)
1	Fishguard	Laugharne	82
2	Laugharne	Mumbles	61
3	Mumbles	Chepstow	84

Day 1: 36 + 46 = 82 miles (82 ≤ 85)

Day 2: 32 + 29 = 61 miles (61 ≤ 85)

Day 3: 40 + 44 = 84 miles (84 ≤ 85)

Check: 82 + 61 + 84 = 227 miles

(b) Bryn plans to cycle a total of 425 miles from Fishguard to London.
He uses Arfon's plan from *(a)*(ii) for the first three days of his cycle ride.
Bryn also cannot cycle more than 85 miles in one day.

Explain why Bryn cannot complete his cycle ride from Fishguard to London in 5 days.

You must show all your working. [2]

After 3 days Bryn has cycled 227 miles.

Miles left to London = 425 − 227 = 198 miles

Most he can cycle in the last 2 days = 2 × 85 = 170 miles

170 miles is less than 198 miles, so he cannot get there.

He would still have 198 − 170 = 28 miles left after 5 days,

so he needs at least 6 days.

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3. A conversion chart for oven temperatures is shown below.

Oven type	Electric oven			Gas oven
	Fan oven	Conventional oven		
Scale	Celsius	Celsius	Fahrenheit	Gas mark
Temperature	120°	140°	275°	1
	130°	150°	300°	2
	140°	160°	325°	3
	160°	180°	350°	4
	170°	190°	375°	5
	180°	200°	400°	6
	200°	220°	425°	7
	210°	230°	450°	8

(a) Dewi is making a cake using a gas oven.
The recipe states:

'Preheat the oven to a temperature of 350° Fahrenheit'.

Use the conversion chart to find the gas mark Dewi should use. [1]

Gas mark ....4....

(b) Ffion is cooking a cake using an electric oven.
Her recipe states:

'Preheat the oven to gas mark 3'.

Ffion uses the conversion chart and correctly sets her oven to 140°.
What type of electric oven does Ffion have? [1]

Fan oven

(c) Dewi's cake needs 25 minutes to cook.
Ffion's cake needs one and a half hours to cook.
How many minutes longer does Ffion's cake take to cook than Dewi's cake? [1]

1½ hours = 90 minutes, 90 − 25 = 65

65 minutes longer

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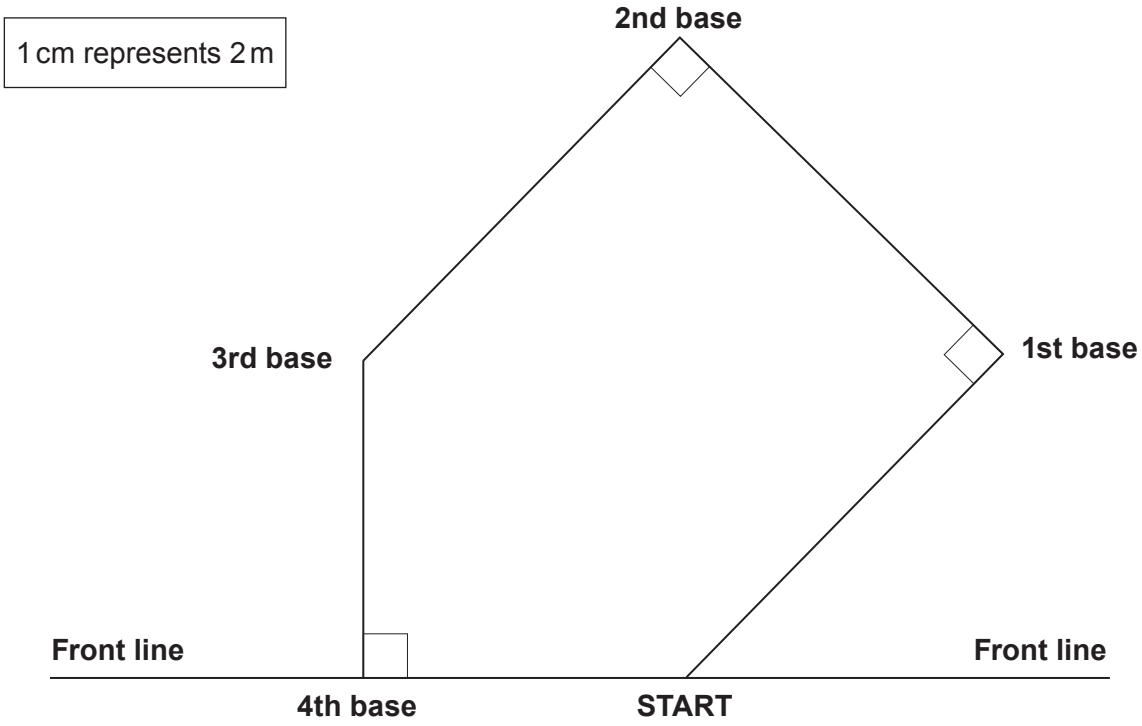
4. The diagram below shows a scale drawing of the pitch used in a game of rounders.
The scale of the drawing is 1 cm represents 2 m.



(a) Use the scale drawing above.
Measure and write down the length of the line from the START to 1st base. [1]

6 cm

(b) Calculate the actual distance from the START to 1st base, in metres. [1]

6 × 2 = 12

Distance is 12 m

(c) The caretaker of a sports ground uses the scale drawing to plan how to mark out the lines of a rounders pitch.
The START and the first three bases are the four corners of a square.

The caretaker marks the lines from the START to 1st base, then to 2nd base, then to 3rd base and finally to 4th base.

What is the total actual length of the lines he marks? [3]

Square side = 12 m, so START→1st, 1st→2nd, 2nd→3rd = 3 × 12 = 36 m

3rd base to 4th base measures 4.2 cm, so 4.2 × 2 = 8.4 m

Total length = 36 + 8.4

= 44.4 m

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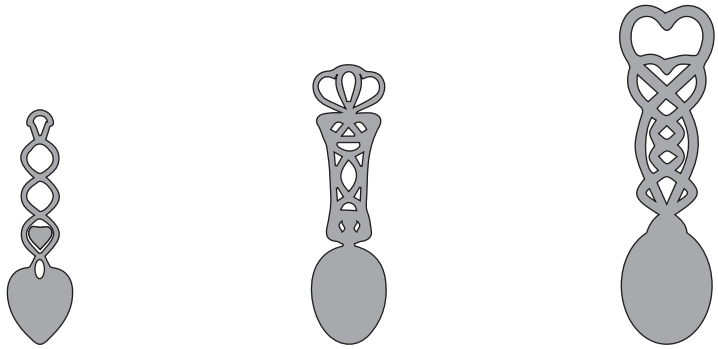
5. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

Mike makes and sells three different designs of Welsh love spoons.



Small Medium Large

The table below shows Mike's sales figures for last September.

	Number sold	Selling price for each love spoon
Small	14	£8.25
Medium	9	£19.95
Large	5	£35.00

It cost Mike £225 to make all these love spoons.

What is Mike's profit from the sale of these love spoons?

You must show all your working. [5 + 2 OCW]

Money from small spoons = 14 × £8.25 = £115.50

Money from medium spoons = 9 × £19.95 = £179.55

Money from large spoons = 5 × £35.00 = £175.00

Total income = £115.50 + £179.55 + £175.00

= £470.05

Profit = total income − cost of making

= £470.05 − £225

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= £245.05

Mike made a profit of £245.05 from selling these love spoons.

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6. A department store employs *trainee* and *qualified* sales staff.

Trainee staff work less than 19 hours per week.

Qualified staff work 19 hours or more per week.

(a) A formula is used to calculate the week's wage for a *trainee*.

Trainee staff wage = number of hours worked per week × £7.75

(i) Joe is a *trainee* who worked for 18 hours last week.

Calculate Joe's wage for last week. [1]

18 × £7.75

= £139.50

(ii) A different formula is used to calculate the week's wage for *qualified* staff.

Qualified staff wage = number of hours worked per week × £10.60 – deductions

Ryan is a *qualified* member of staff who worked for 23 hours last week.

His deductions for last week were £21.39.

Calculate Ryan's wage for last week. [2]

23 × £10.60 – £21.39

= £243.80 – £21.39

= £222.41

(iii) How much more did Ryan earn than Joe last week? [1]

£222.41 – £139.50

= £82.91

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(b) Ashton is a member of staff who works the same hours every week.

Day	Start time	Finish time
Mon	10 a.m.	3 p.m.
Wed	10 a.m.	3 p.m.
Fri	2 p.m.	6:30 p.m.
Sun	10 a.m.	3:30 p.m.

Use this information to decide if Ashton is a *trainee* or a *qualified* member of staff.

Put a tick in the correct box
Give a reason for your answer.
You must show all your working. [2]

Trainee ☐ *Qualified* ☑

Mon 10 a.m. to 3 p.m. = 5 h, Wed 10 a.m. to 3 p.m. = 5 h

Fri 2 p.m. to 6:30 p.m. = 4½ h, Sun 10 a.m. to 3:30 p.m. = 5½ h

Total = 5 + 5 + 4½ + 5½ = 20 hours per week

Ashton works 20 hours, which is 19 hours or more,

so Ashton is a qualified member of staff.

(c) Elena is a manager at the department store who is paid £1760 every month.

She invests 8% of her monthly pay into a pension fund.

How much does she invest into her pension fund every month? [2]

8% of £1760 = 8 ÷ 100 × 1760

= 0.08 × 1760

= £140.80

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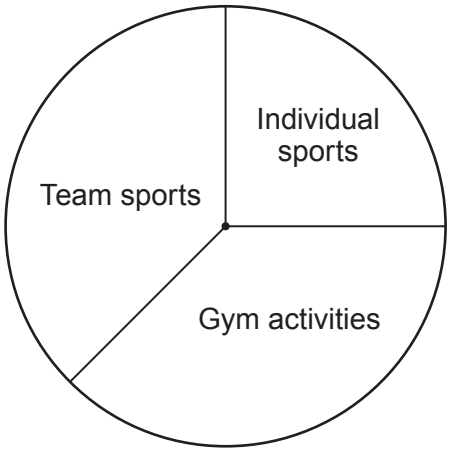
7. In a survey, 720 students were asked if they preferred to take part in *gym activities*, *team sports* or *individual sports*.
They were asked to choose just one of these options.
The results are displayed in the pie chart below.



(a) How many students selected *individual sports*?
Circle your answer. [1]

90 180 270 405 540

(b) Carwyn plans to split *team sports* on the pie chart into *football* and *other team sports*.
Of the students who selected *team sports*, $\frac{2}{5}$ said their preferred team sport was *football*.
What angle should Carwyn draw to represent *football*? [3]

Team sports angle (measured) = 135°

$\frac{2}{5} \times 135°$

= 54°

Angle is 54 °

(c) 720 students took part in the survey. Only 45% were **female**.
How many **males** took part in the survey? [2]

Males = 100% − 45% = 55%

0.55 × 720 = 396

Number of males is 396

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8. Miss Price has received her total bill for water.
It is based on estimates of how much fresh water is used and how much waste water is produced.
Her bill is £58.80.

Miss Price's **actual** use of water was as follows:
- fresh water used 25·25 m^3,
- waste water produced 22·31 m^3.

Fresh water used costs £1.08 per m^3.
Waste water produced costs £1.70 per m^3.

By how much has Miss Price been overcharged or undercharged?
You must show all your working. [4]

Fresh water cost = 25.25 × £1.08 = £27.27

Waste water cost = 22.31 × £1.70 = £37.927

Actual total cost = £27.27 + £37.927 = £65.197

= £65.20 (to the nearest penny)

Difference = £65.20 − £58.80 = £6.40

The bill (£58.80) is less than the actual cost (£65.20),

so Miss Price has been undercharged by £6.40.

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9. Emrys, Layla and Rhys go shopping together for fruit.
They buy pears and apples from a market stall.

Emrys buys 3 pears and 1 apple for £1.22.

Layla buys 3 apples for 78p.

Rhys buys 5 pears and 2 apples.

How much change will Rhys receive from £5 when paying for 5 pears and 2 apples? [6]

Cost of 1 apple = 78p ÷ 3 = 26p

3 pears + 1 apple = 122p

3 pears = 122p − 26p = 96p

Cost of 1 pear = 96p ÷ 3 = 32p

Rhys: 5 pears + 2 apples = 5 × 32p + 2 × 26p

= 160p + 52p

= 212p = £2.12

Change = £5 − £2.12 = £2.88

Change from £5 is £ 2.88

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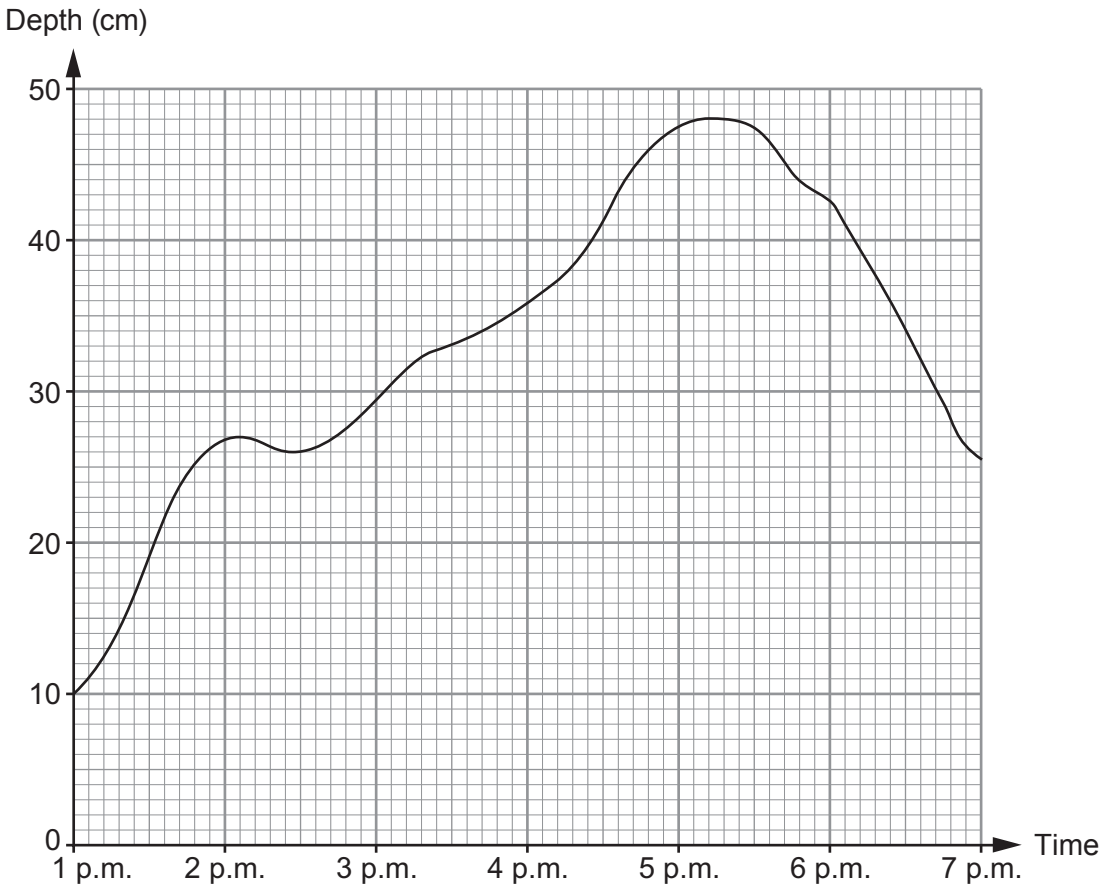
10. Carys has to write a report on the water levels of the River Tad.
She has recorded the depth of the water in the River Tad between 1 p.m. and 7 p.m.
This is shown in her graph below.



(a) What was the greatest recorded depth of water in the river?
Circle your answer. [1]

26 cm 27 cm 46 cm 48 cm 50 cm

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(b) In which of these 15-minute periods was the depth of water increasing most rapidly? Circle your answer. [1]

1:15 p.m. to 1:30 p.m. 4:15 p.m. to 4:30 p.m. 5:00 p.m. to 5:15 p.m.

6:00 p.m. to 6:15 p.m. 6:15 p.m. to 6:30 p.m.

(c) Carys looks at the part of the graph for the period 6 p.m. to 7 p.m. Describe what this tells her about the river. [1]

The depth of the water in the river is decreasing (the water level falls).

(d) For what period of time was the depth of water in the river greater than 45 cm? Circle your answer. [1]

48 minutes 1 hour 1 hour 12 minutes

1 hour 24 minutes 1 hour 30 minutes

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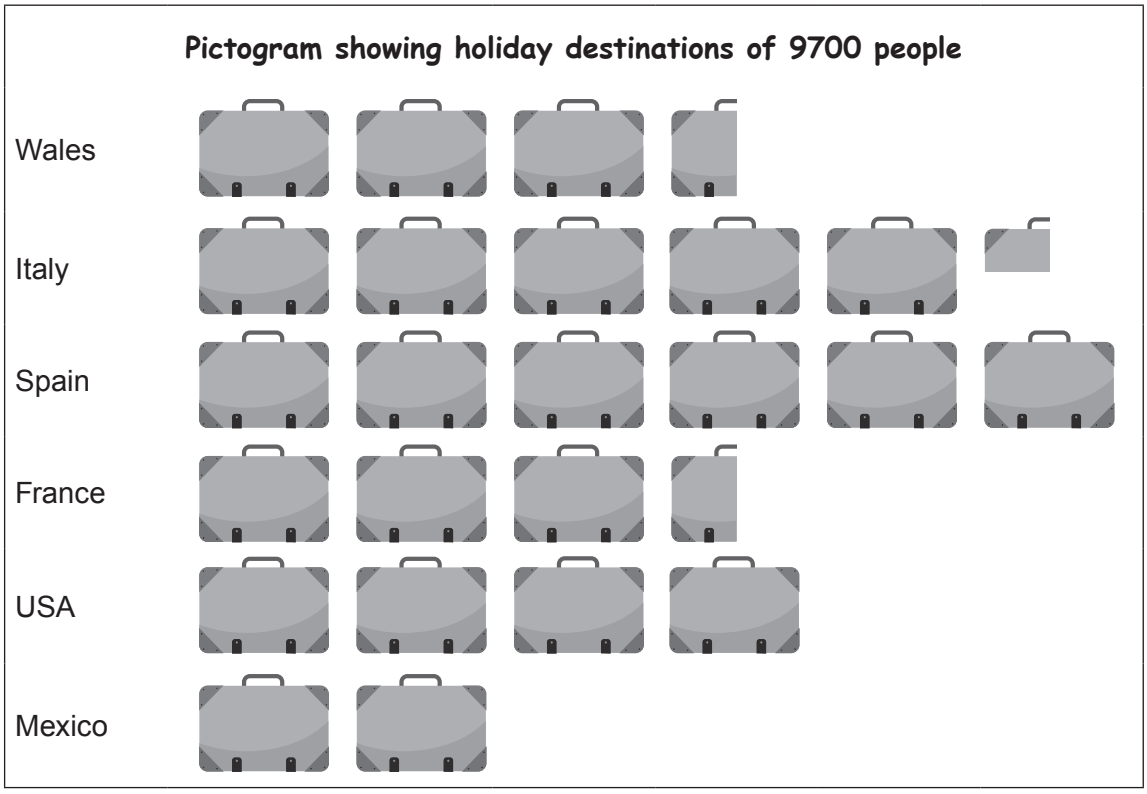
11. Mena is going on holiday.
She hasn't decided where to go yet.
In a travel brochure, Mena sees a pictogram showing the holiday destinations of 9700 people.



(a) Complete the key for the pictogram. [3]

represents ....400.... people

Wales 3.5 + Italy 5.25 + Spain 6 + France 3.5 + USA 4 + Mexico 2

= 24.25 suitcases

9700 ÷ 24.25 = 400

So one suitcase represents 400 people.

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(b) Mena goes on holiday to France.
She takes 590 euros with her on holiday.

Mena only spends 40% of her euros.

When she returns from holiday, she exchanges her remaining euros for pounds.
The exchange rate is £1 = 1.18 euros.
How many pounds does Mena receive? [4]

Mena does not spend 100% − 40% = 60% of her euros.

Euros left = 0.6 × 590 = 354 euros

Pounds = 354 ÷ 1.18

= £300

Mena receives £300.

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12. Grace sees a newspaper advertisement for *Blake's Mopeds*.

Blake's Mopeds

Best deal!
Valid if you show this advertisement.

Moped £400

Helmet should be £80, we offer 15% off this price

Other costs payable are
- insurance £151.20, and
- vehicle tax £37.

Grace is planning to save for this offer.
She also wants to save enough money for the first month's fuel.

The moped travels 20 miles on each litre of fuel.
A litre of fuel costs £1.26.
Grace estimates she will travel approximately 350 miles each month on her moped.

Starting this month, Grace will be able to save £60 per month.

After how many **complete** months will Grace have saved enough money for this offer, including the first month's fuel?
You must show all your working. [6]

Helmet = £80 − 15% of £80 = 0.85 × 80 = £68

Fuel for 1 month = 350 ÷ 20 = 17.5 litres, 17.5 × £1.26 = £22.05

Total cost = £400 + £151.20 + £37 + £68 + £22.05

= £678.25

Months needed = £678.25 ÷ £60 = 11.304...

11 months: 11 × £60 = £660, which is less than £678.25

12 months: 12 × £60 = £720, which is enough

Grace will have saved enough after 12 complete months.

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

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