Surname	Centre Number	Candidate Number
Other Names		0

GCSE – NEW

3310U20-1

A16-3310U20-1

MATHEMATICS – NUMERACY
UNIT 2: CALCULATOR-ALLOWED
FOUNDATION TIER

FRIDAY, 4 NOVEMBER 2016 – 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 in this booklet.

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

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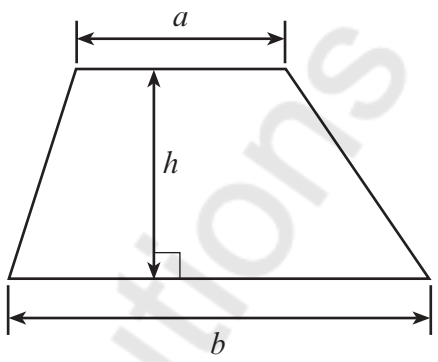
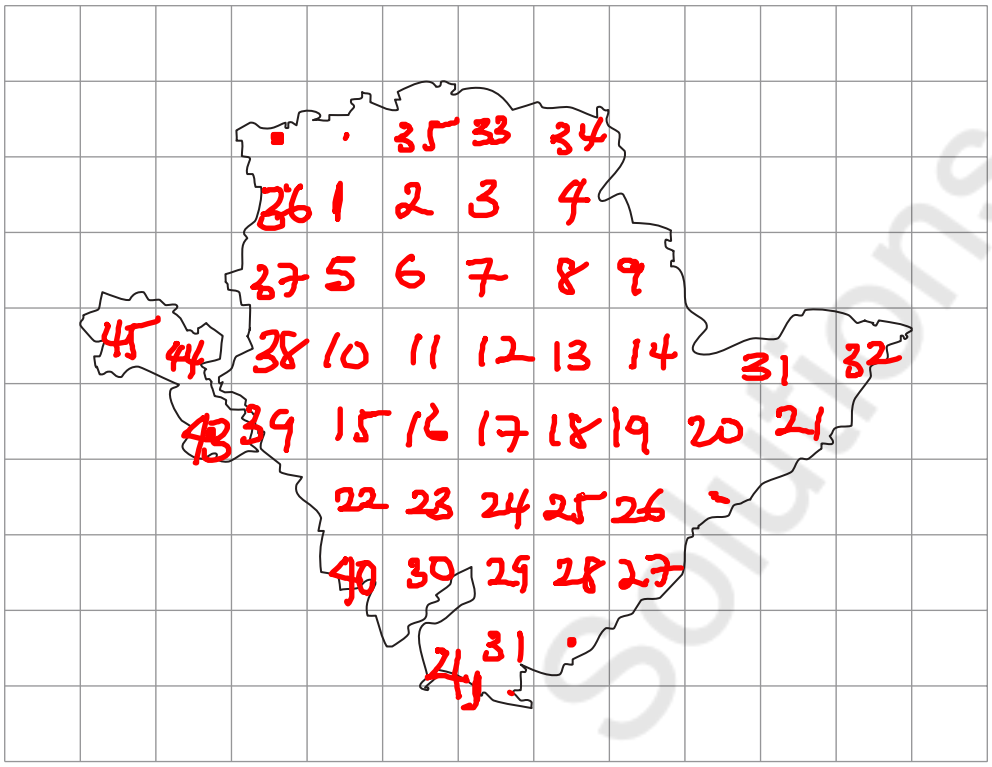
Formula List - Foundation Tier

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



Examiner only

1. *(a)* A map of Anglesey is drawn on the grid below.



Each square on the grid represents an area of **16 km²**.
Find the approximate area of Anglesey in km².

[3]

Each square Area = 16 km²

Total square of Anglesey is 45

Area of Anglesey is 720 km². 16 × 45 = 720

(b) There is a coastal path around Anglesey.

Diagram not drawn to scale

Cennydd took 8 days to complete the walk around the coastal path.
He recorded the number of miles that he walked on each of the 8 days.

20, 17, 10, 19, 15, 14, 13, 17

What is the median number of miles walked each day?

[2]

10, 13, 14, 15, 17, 17, 19, 20

Average of 15 and 17 $\frac{15+17=32}{2}$ $\frac{32}{2}$

16 km

Examiner only

2. Mr Jones and his family visited a café for breakfast.
They ordered from the breakfast menu.

100p = 1£
1p = 1/100 £
95p
£0.95

BREAKFAST MENU

Full breakfast £7.50 (Child's breakfast half price)	Tea £1.85
Cereal £2.95	Coffee £1.85
Toast and jam 95p	Fruit juice £1.95

(a) Complete their bill. [4]

380p
£3.80

ITEM	COST (£)
2 full breakfasts	£15.00
1 child's breakfast	7.5/2 = £3.75
4 toast and jam	4×95 = £3.80
3 teas and 2 coffees	5×1.85 = £9.25
TOTAL	£31.8

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Examiner only

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

Mr Jones paid for the breakfast with two £10 and three £5 notes, and told the waitress to keep the change as a tip.
A reasonable tip is thought to be more than 10% of the total cost of the bill.

Explain whether or not Mr Jones gave the waitress a reasonable tip.
You must show all your working. [4 + 2 OCW]

Two £10 notes = £10 + £10 = £20
Three £5 notes = £5 + £5 + £5 = £15
Mr Jones Paid : £20 + £15 = £35

Total Cost of the bill = £31·8
10% of Total Cost of bill is best tip
Minimum Tip = 10% of £31·8
$= \frac{10}{100} \times 31{\cdot}8 =$ £3·18

Mr Jones Paid £35
Normal Bill is £31·8
Tip = £35 − £31·8
Tip = £3·2

So, Since the tip (£3·2) is greater than the minimum required tip (£3·18). Then, Mr Jones gave a reasonable tips

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 (3310U20-1) Turn over.

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3. The number of people entitled to vote at a National Assembly for Wales election in 2014 is given below.

Region	Number of people
South Wales	1 358 971
Mid Wales	423 357
North Wales	471 891
Total	2 254 219

(a) What is the total number of people entitled to vote? [1]

Total people entitle to vote is
1358 971 + 423 357 + 471 891
2 254 219

(b) The South Wales region is split into South West, Central and South East Wales.

South Wales region	Number of people
South West	395 019
Central	496 249
South East	x
Total	1 358 971

What is the total number of people entitled to vote in South East Wales? [2]

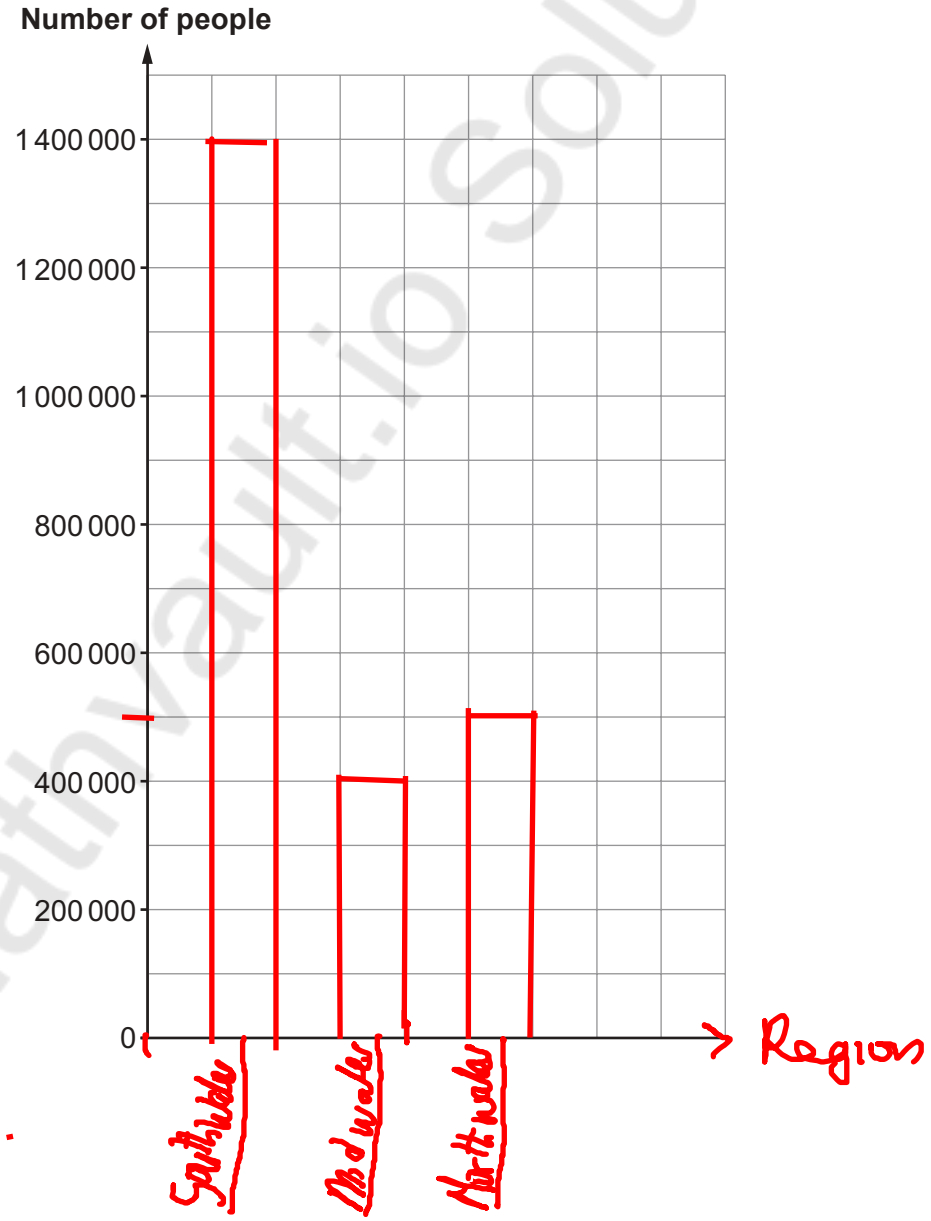
Sum = 1358 971
395 019 + 496 249 + x = 1358 971
891, 268 + x = 1 358 971
x = 1358 971 − 891 268
South East = x = 467, 703

Examiner only

(c) The number of people entitled to vote at a National Assembly for Wales election in 2014 is given below, correct to the nearest hundred thousand.

Region	Number of people
South Wales	1 400 000
Mid Wales	400 000
North Wales	500 000

Use the squared paper below to draw a suitable bar chart to represent this data. [2]



Examiner only

4. Jane lives in Cardiff and plans to travel to Bangor.

(a) Jane considers catching the train.

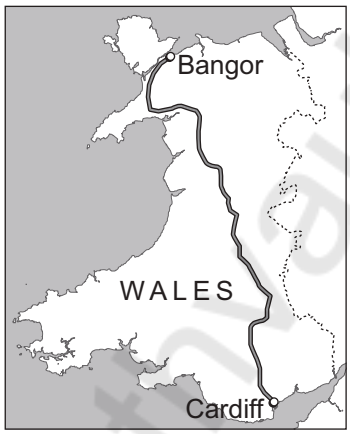
TRAIN TIMES: CARDIFF TO HOLYHEAD

Cardiff Central	05:10	07:21	09:21
Hereford	06:25	08:27	10:27
Chester	08:19	10:19	12:19
Bangor	09:33	11:38	13:28
Holyhead	10:22	12:22	14:22

Jane wants to arrive at Bangor before 1 p.m.
She could catch the 07:21 train from Cardiff Central.
How long would the train journey to Bangor take? [1]

07:21 Stop 11:38
08:21 1hr 11:21 1hr
09:21 1hr 11:38 17mins
10:21 1hr Total time: 4hrs 17mins

(b) Jane decides to drive to Bangor.



Cardiff to Bangor
JOURNEY DETAILS

Distance 200 miles
Time (normal traffic) 4 hours 30 minutes

(i) Jane knows that her car travels 50 miles on one gallon of petrol.
The cost of petrol is £5.90 per gallon.
How much will the petrol cost for Jane to drive from her home to Bangor?
You must show all your working. [2]

Total Distance Cardiff – Bangor → 200miles
Car → 50miles / gallons.
100miles → 2gallons
200miles → 4gallons
Cost of petrol → £5.90 per gallon
Total Cost = 5.90 × 4 = £23.60

Examiner only

(ii) Jane needs to take a break after every 1 hour 15 minutes of driving.
How many breaks will she need to take before reaching Bangor? [1]

Break after 1hr 15 mins of driving
Total time from Cardiff to Bangor is 4hrs 30mins
first 1hr 15 mins → first Break
2hrs 30mins → Second Break
3hrs 45 mins → Third Break
4hrs 30 → Total break = 3

(iii) Jane decides to allow five and a half hours for the whole journey.
She needs to arrive in Bangor by 1 p.m.
What is the latest time she should leave Cardiff? [1]

Time to arrive Bangor 1pm.
Total time → 5hrs 30mins

1pm
1hr → 12 noon
1hr → 11:00
1hr → 10:00
1hr → 9:00
1hr → 8:00
30mins → 7:30pm

So, she needs to leave by 7:30pm

H = x + Book fee
H > B

Examiner only

5. Dafydd plans to hire a van.
He can only hire the van for a **whole number of days**.
The cost of hiring the van is given by the formula:

hire cost = £42 × number of days + booking fee

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

When the booking fee is £18, the hire cost for 2 days is £102.	TRUE	FALSE
The hire cost is always greater than the booking fee.	TRUE	FALSE
When the van is hired for one extra day, the hire cost will be an extra £42.	TRUE	FALSE
The hire cost for 2 days is double the hire cost for 1 day.	TRUE	FALSE

Two Hire cost = 42 × No of days + Book fee
Hire cost = 42 × 2 + 18 = 84 + 18
= £102 Two days

Hire ≥ Book fee
HC = 42 × 1 + 18 = 60 one day

(b) Explain why the hire cost cannot be £124 when the booking fee is £18.
You must show all your working. [2]

HC = 124 BF = 18
HC = 42 × d + BF
124 = 42d + 18
124 − 18 = 42d
106 = 42d
d = 106 / 42 = 2.52 days

Since the number of days is not a whole number then the hire cost cannot be £124 when the booking fee is £18

Examiner only

6. The diagram shows the plan of the floor of Nick's room.

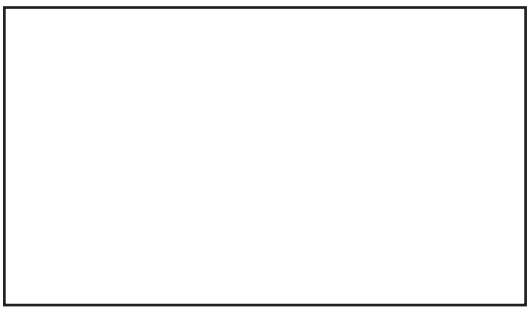


Diagram not drawn to scale

Nick is going to fit square carpet tiles to cover the floor.

Square carpet tiles

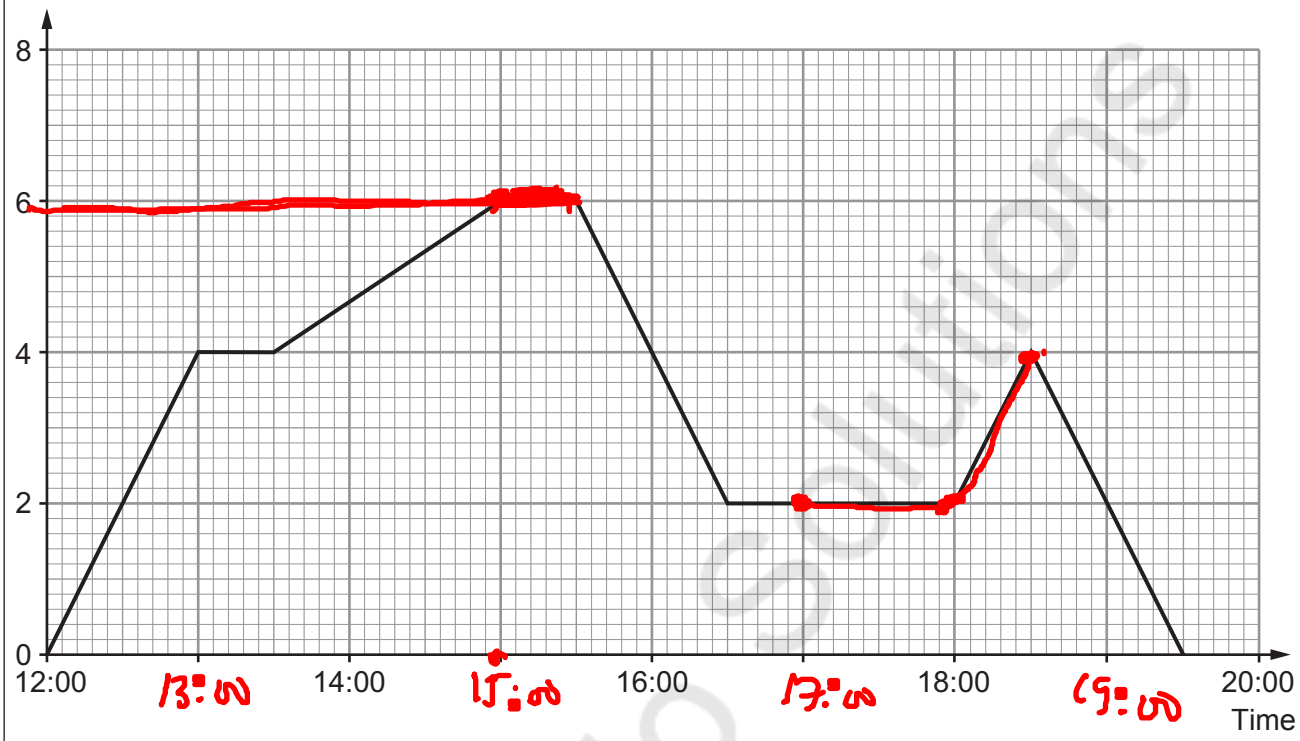
Each tile measures
0·5 m by 0·5 m

£2.50 per tile

How much will it cost Nick to cover his floor with these carpet tiles?
You must show all your working. [4]

Examiner only

7. The travel graph below shows a journey Gareth made yesterday.



(a) How far away from home was Gareth at 15:00?
Circle your answer. [1]

0 km 2 km 4 km 6 km 8 km

(b) At what time did Gareth arrive back home?
Circle your answer. [1]

14:00 16:30 18:45 19:15 19:30

(c) Sometime after 5p.m., Gareth headed for the supermarket.
The supermarket was closed when he got there so he headed straight back home.
At what time did Gareth arrive at the supermarket?
Circle your answer. [1]

17:00 17:30 18:00 18:15 18:30 19:00

(d) Gareth did not stop for the whole of the time between 15:00 and 15:30.
What could the travel graph tell you about his journey between these times? [1]

Between 15:00 and 15:30, the distance was constant (6 km) i.e. Gareth was not moving away from home or towards home

Examiner only

8. Ewan is going on holiday to India.
He has saved £450 to exchange for Indian rupees.

(a) The exchange rate on the internet last week was £1 = 99.40 rupees.
Had Ewan been going on holiday last week, how many rupees could he have bought?
[2]

£1 = 99.40 rupees

£450 = 99.40 × 450

= 44,730 rupees

(b) Ewan exchanges his money on arrival in India.
The exchange rate is now £1 = 99.72 rupees.

The exchange bureau only has 500 rupee notes.
Ewan wants to buy as many rupees as possible with his £450 savings.

How much of his £450 will Ewan spend buying rupees?
Give your answer correct to the nearest penny.
You must show all your working.
[4]

£1 = 99.72 rupees

£450 = 99.72 × 450

= 44,874 rupees

500 rupees note = $\frac{44,874}{500}$

= 89.748

So, Eran can only get 89 500 rupees note

89 500 rupee note = 89 × 500 = 44,500 rupees

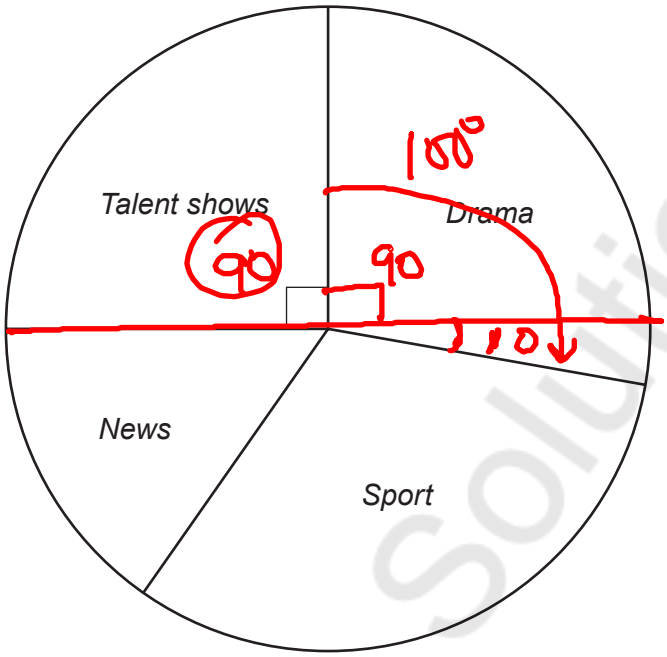
Since £1 = 99.72 rupees

44,500 rupees = $\frac{44500}{99.72}$ = 446.23

Eran needs to spend £446.23

Examiner only

9. *(a)* 36 000 people took part in a survey to find out their favourite type of TV programme. The pie chart shows the results.



(i) How many people chose *Drama* as their favourite type of TV programme? You must show your working. [3]

Drama = $\frac{\text{Angle Drama}}{360}$ × Total People Surveyed

Drama = $\frac{100}{360}$ × 36,000

Drama = 10,000

Examiner only

(ii) Twice as many women as men chose *Talent shows* as their favourite type of TV programme.
Calculate how many women chose *Talent shows*.
You must show your working. [3]

men = x women = 2x

Talent = $\frac{\text{Angle of Talent}}{360} \times$ Total People Surveyed

$= \frac{90}{360} \times 36000$

Talent = 9000

$x + 2x = 9000$

$3x = 9000$

$x = \frac{9000}{3} = 3000$

men = x = 3000 women = 2x = 2x 3000 = 6000

(b) 1000 people were asked,

'Should news programmes include details of the weather?
Yes or No?'

70% of the people answered 'yes'. 700
A pie chart is to be drawn to represent the answers to this question.
What size would the angle be to represent the answer 'yes'? [2]

70% of 1000 said yes.

$\frac{70}{100} \times 1000 = 700$ $700 = \frac{x}{360} \times 1000$

Angle representing 'yes' is 252°. $700 = \frac{1000x}{360}$

No of People that said Yes = $\frac{\text{angle of Yes}}{360} \times$ total people

$700 \times 360 = 1000x$

$x = \frac{700 \times 360}{1000} = 252°$

Examiner only

10. *(a)*

Railcard for 16 to 25 year olds
£30 for a year
Get $\frac{1}{3}$ **off** all your rail travel

Nerys and Eleri are sisters.
Nerys is 22 years old and Eleri is 27 years old.

The two sisters live in Holyhead.
Their aunt lives in Milford Haven.
They travel by train to visit their aunt 3 times a year.

Nerys buys a 16-25 Railcard to use for these journeys.
They buy single rail tickets for each journey.
The cost of a **single** rail ticket from Holyhead to Milford Haven is £84.50.
The journey home from Milford Haven also costs £84.50 per ticket.

In a year, how much less does Nerys pay than Eleri for the journeys to Milford Haven and back?
You must show all your working. [5]

16 – 25 years → £30
off = 1/3
Nerys → 22 years
Eleri → 27 years
Number of time travel → 3 time
Total travel time → 6
Eleri Pay [6 journey] = 6 x 84.50 = £507
off payment 1/3 of 507 = 1/3 x 507 = £169
Nerys = 507 − 169 = £338 + 30
Nerys = £368
The Difference = £507 − £368
£139
Nerys will pay £139 less than Eleri.

Examiner only

(b) Cristiano is 22 years old.
He sometimes travels from Rhyl to Llandudno Junction by train.
The cost of a single rail ticket from Rhyl to Llandudno Junction is £7.80.

Nerys advises Cristiano to buy a Railcard.
Cristiano says,

> It is not worth paying £30 for the Railcard.

How many times in a year would Cristiano have to travel to make it worthwhile for him to buy a Railcard? [3]

$\frac{1}{3}$ of 7.8 = £2.6

Each journey cost = £5.2

Rhyl to Llandudno = £7.80

Let number of time travels be x.

The normal total cost without Rail card

normal cost = $7.8 \times x$ = £$7.8x$

Total cost paying for Railcard for x

$5.2 \times x + 30$

$x = 12$

$7.8x \geq 5.2x + 30$

$7.8x - 5.2x \geq 30$

$2.6x \geq 30$

$x \geq 30/2.6$

$x \geq 11.5$

$x \geq 12$

Examiner only

11. Loretta is paid in euros.
She is checking her tax bill for last year.

The tax rates last year were as follows:

- No tax on the first €3500 of earnings
- Earnings in excess of €3500 and up to €10 500: taxed at a rate of 25%
- Earnings above €10 500: taxed at a rate of 35%

Last year, Loretta's total earnings before tax were €34 500.

How much tax did Loretta pay in total?
You must show all your working. [6]

No tax for the first €3500
Tax rate 25% for earning 3500 – 10,500
Tax rate 35% for earning above 10,500
Last year earnings €34,500
Case 1: The first 3500 No tax
34,500 – 3500 = €31,000 No tax

Case 2: 3500 – 10500 Tax rate 25%
3500 + 7000 = 10,500
25% of 7000 = $\frac{25}{100} \times 7000 = €1750$
Tax = €1750

Case 3:
31000 – 7000 = 24000
35% of 24000 = $\frac{35}{100} \times 24000$
Tax paid = € 10,150 = 8400
Tax = €8400

END OF PAPER

Total tax: 0 + 1750 + 8400
= 10150

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

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