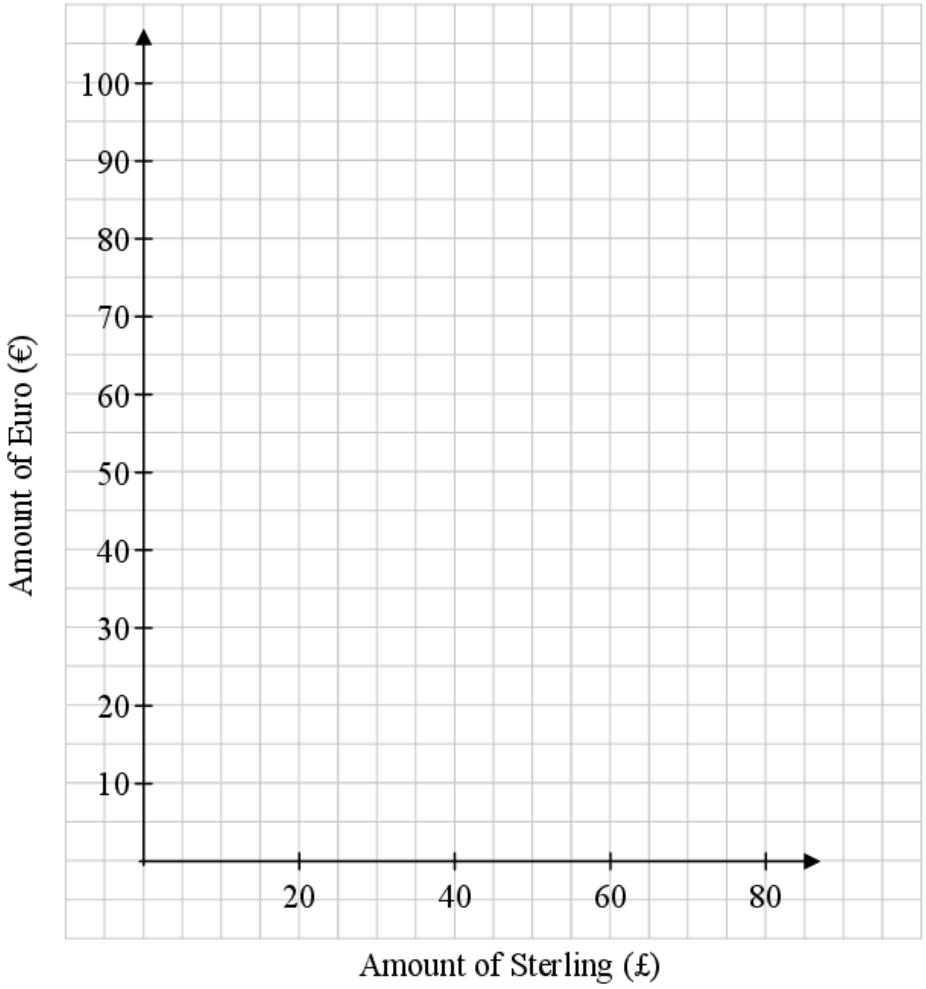
Question 1

Jack and Sarah are going on a school tour to England. They investigate how much different amounts of sterling (£) will cost them in euro (€). They each go to a different bank.

Their results are shown in the table below.

Amount of sterling (£)	Cost in euro (€) for Jack	Cost in euro (€) for Sarah
20	33	24
40	56	48
60	79	72
80	102	96

(i) On the grid below, draw graphs to show how much the sterling will cost Jack and Sarah, for up to £80.



(ii) Using the table, or your graph, find the slope (rate of change) of Jack's graph.
Explain what this value means. Refer to both euro and sterling in your explanation.

Slope:

Explanation:

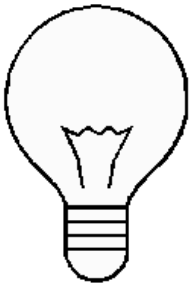
(iii) Write down a formula to represent what Jack must pay, in euro, for any given amount of sterling. State clearly the meaning of any letters you use in your formula.

(iv) Write down a formula to represent what Sarah must pay, in euro, for any given amount of sterling. State clearly the meaning of any letters you use in your formula.

(v) Using your formulas from **(iii)** and **(iv)**, or otherwise, find the amount of sterling Jack and Sarah could buy that would cost them the same amount each in euro.

Question 2

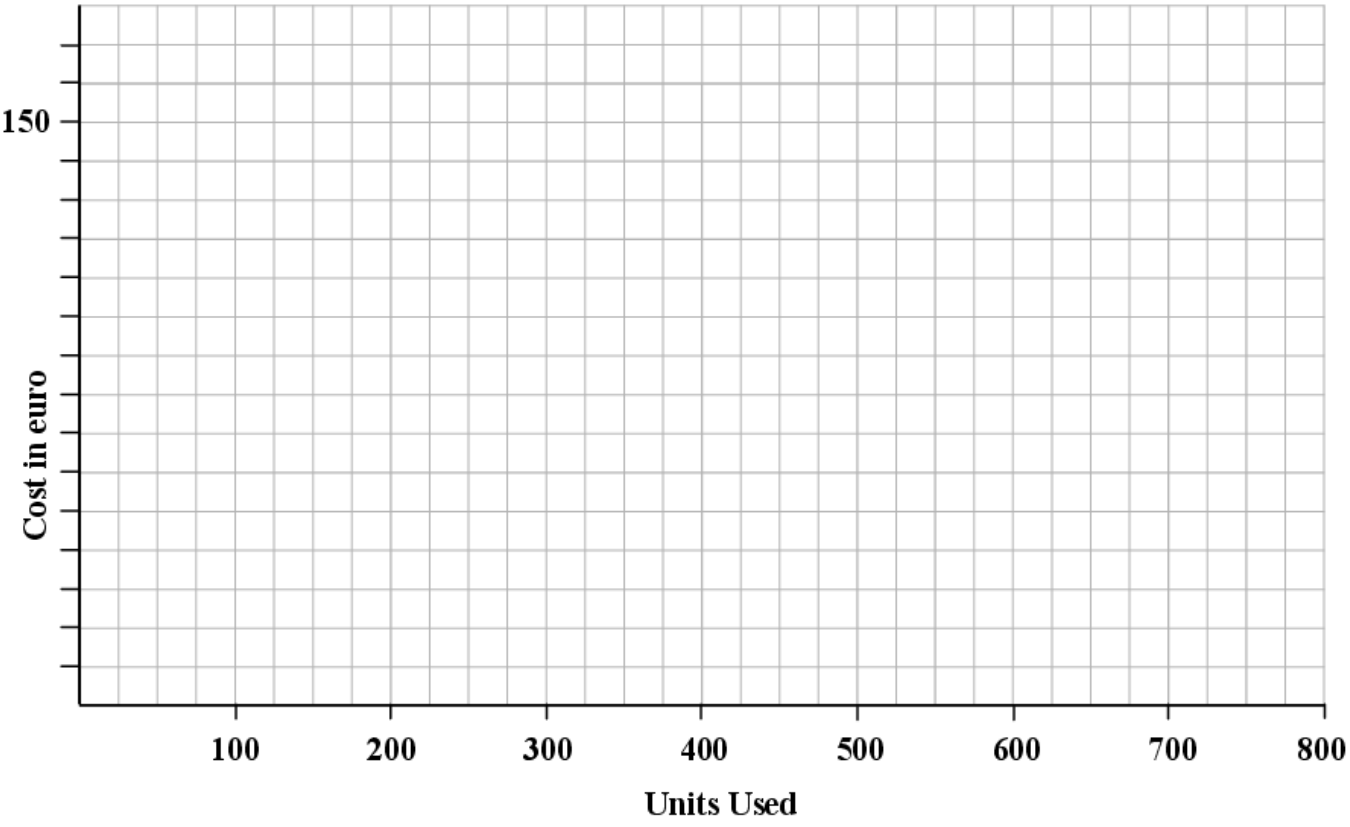
Lisa is on a particular payment plan called "Plan A" for her electricity. She pays a standing charge each month even if no electricity is used. She also pays a rate per unit used. The table shows the cost, including the standing charge, of using different amounts of units, in a month.



Units Used	Plan A Cost in euro
100	38
200	56
300	74
400	92
500	110
600	128
700	146
800	164

(a) Use the data in the table to show that the relationship between the number of units used and the cost is linear.

(b) Draw a graph to show the relationship between the number of units used and the cost of electricity.



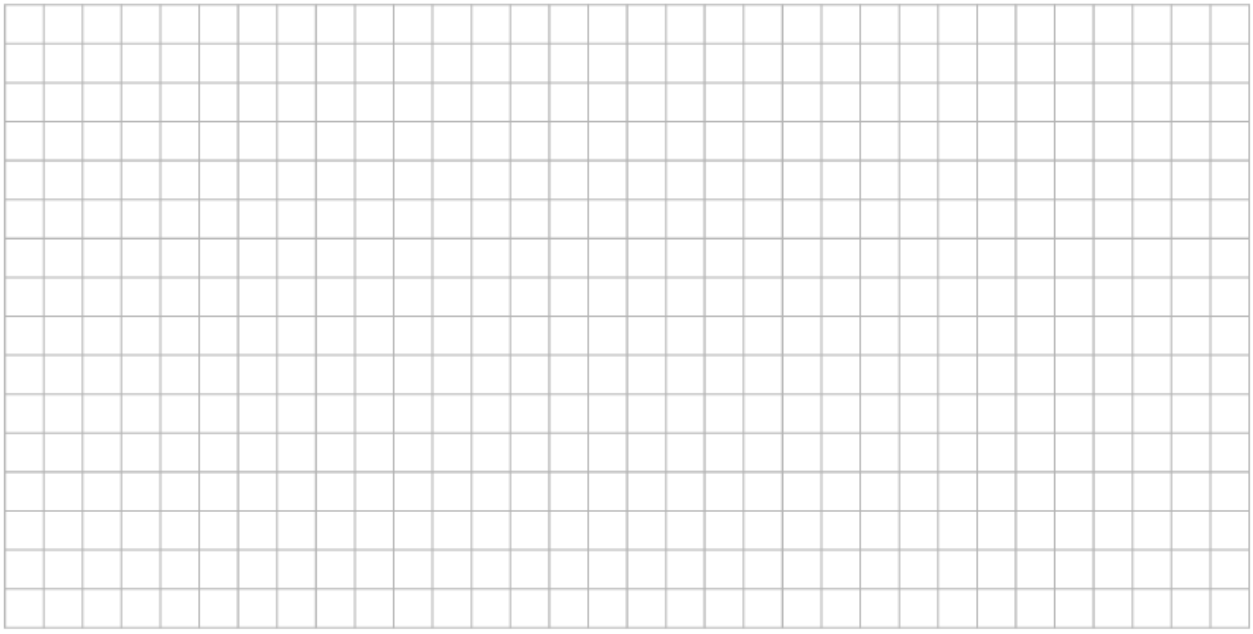
(c) Use your graph to estimate the standing charge. _____

(d) Write down a different method of finding the standing charge.
Find the standing charge using your method.

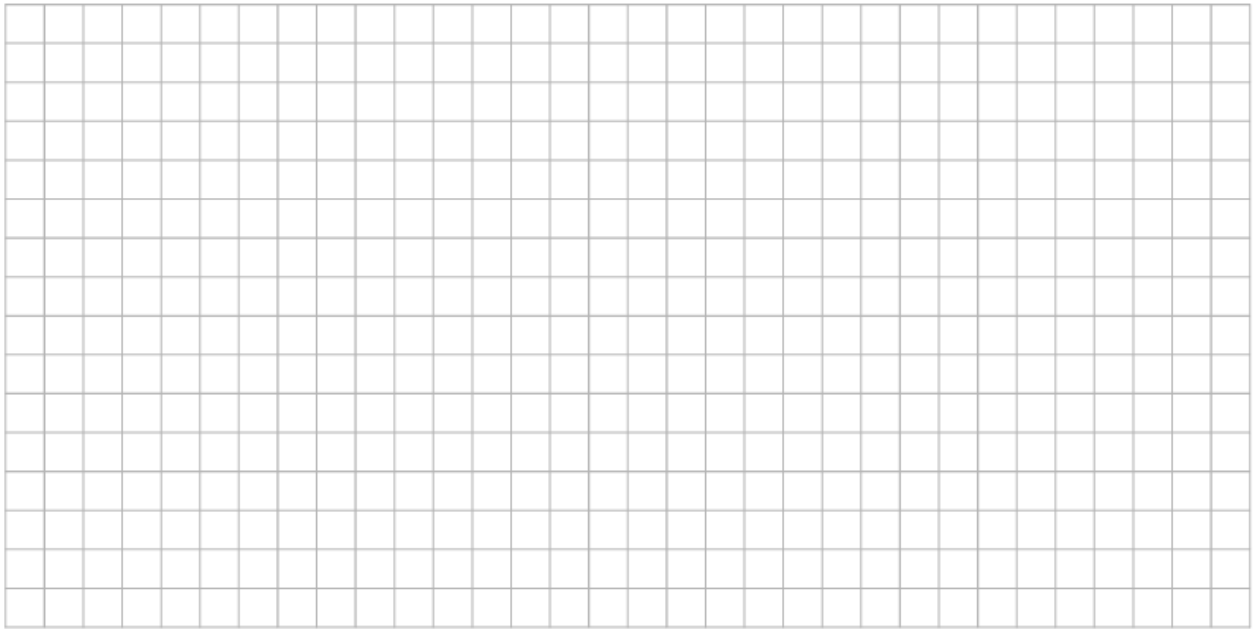
Method:

Standing charge:

(e) Write down a formula to represent the relationship between the number of units used and the cost for any given number of units.



(f) The table above does not include VAT. One month Lisa used 650 units.
Her total bill for that month, including VAT, was €155·50.
Find the VAT rate on electricity, correct to one decimal place.



(g) Lisa is offered a new plan, "Plan B", where the standing charge is €36 and the rate per unit used is 15·5 cent. Complete the following table for Plan B.

Units Used	Plan B Cost in euro
100	
200	
300	
400	
500	
600	
700	
800	

(h) Which plan do you think Lisa should choose? Give a reason for your answer.

(i) On your diagram for part **(b)**, draw a graph to show the relationship between the number of units used and the cost of electricity for Plan B. Label this graph "Plan B".

(j) Use your diagram to find the number of units for which both plans have the same cost.

Question 3

The table shows the height, in metres, of a ball at various times after being kicked into the air.

(i) Is the pattern of heights in the table linear, quadratic, or exponential? Explain your answer.

Time (seconds)	0	0·5	1	1·5	2	2·5	3
Height (metres)	0·3	3·4	5·7	7·2	7·9	7·8	6·9

(ii) Estimate the height of the ball after 3·5 seconds.

(iii) Estimate the total time the ball spends in the air. Justify your answer.