

Surname	
Other Names	
Candidate's Signature	

GCSE 9 - 1 Questions

Inequality Graphs

Calculator Allowed

INSTRUCTIONS TO CANDIDATES

- Write your name in the space provided.
- Write your answers in the spaces provided in this question paper.
- Answer ALL questions.
- Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
- You should have a ruler, compass and protractor where required.

Total Marks :

1)(a) Draw the lines

$$y = 3x + 2$$

$$y = 6 - 2x$$

and $y = 3$

on the grid opposite.

Indicate clearly the region R where

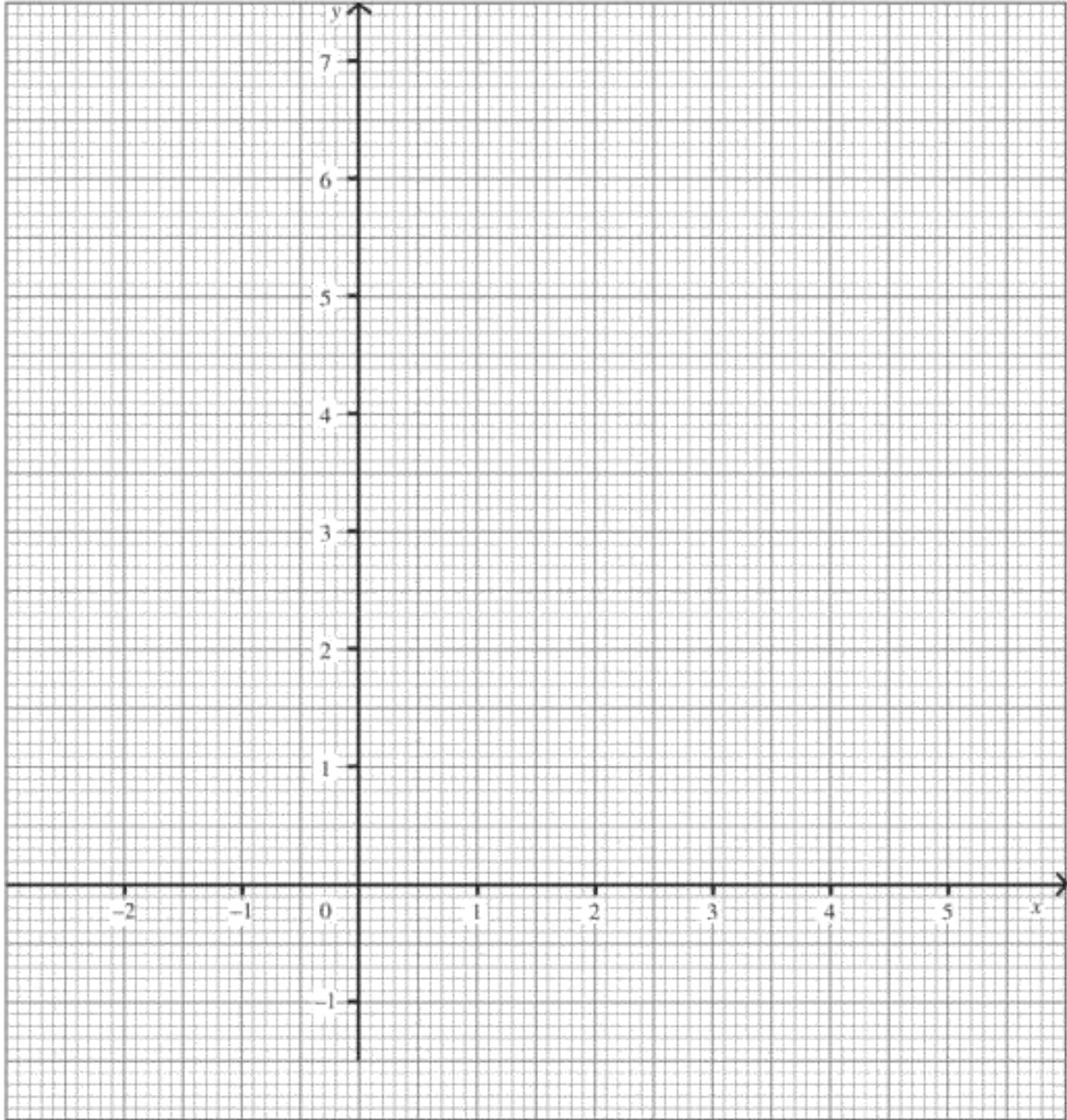
$$y \leq 3x + 2, \quad y \leq 6 - 2x \quad \text{and} \quad y \geq 3 \quad [3]$$

(b) (i) Find the least value of x for which (x, y) satisfies all the inequalities.

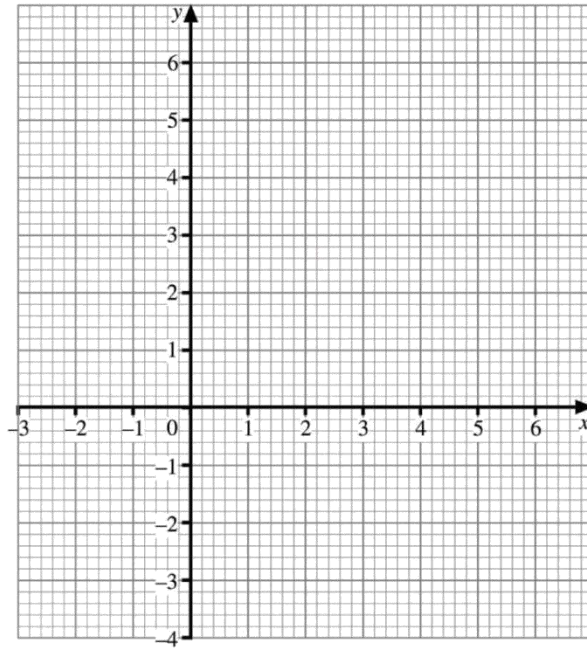
Answer _____ [1]

(ii) Find the greatest value of $y + 4x$ for which (x, y) satisfies all the inequalities.

Answer _____ [2]



2)



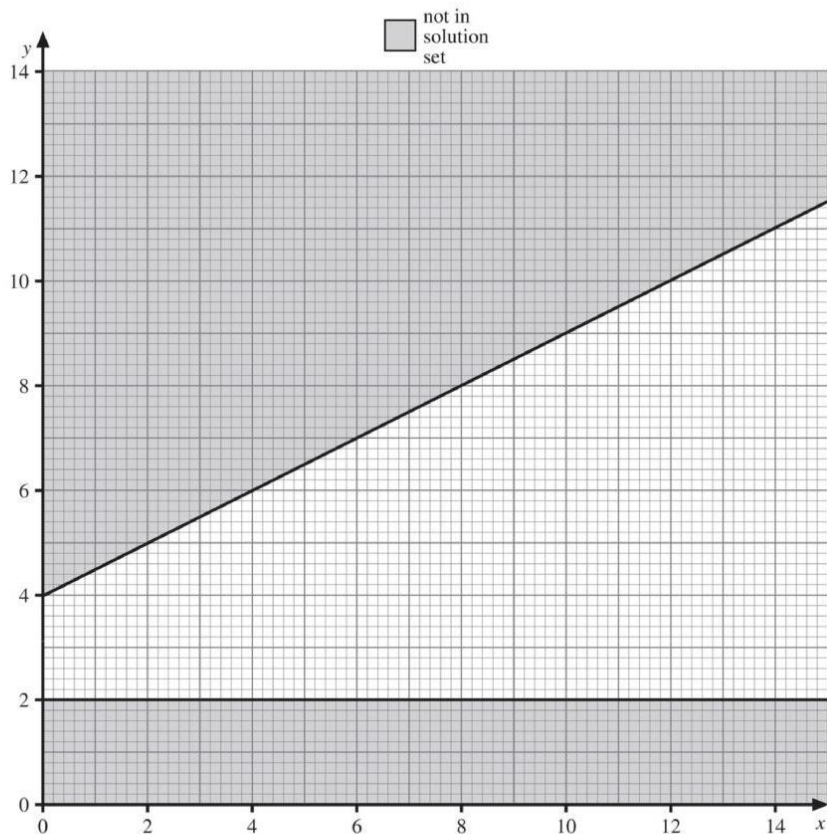
- (a) Draw the graph of $y = 5 - 2x$ on the grid above. [3]
- (b) Use the graph to find the point of intersection of the line $y = 2$ with the line $y = 5 - 2x$.

Answer (_____, _____) [2]

- (c) On the grid mark, with the letter R, the region which satisfies the inequalities

$$y \geq 5 - 2x, \quad y \geq 2, \quad x \leq 5 \quad [3]$$

3) The region for which $y \geq 2$ and $2y \leq x + 8$ is shown **unshaded** in the diagram.



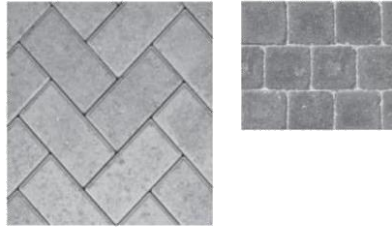
- (a) On the diagram illustrate also the inequalities $x \geq 3$ and $x + y \leq 13$ [2]
- (b) For integer values of x and y which satisfy the 4 inequalities, what is the least value of y ?

Answer $y =$ _____ [1]

- (c) Find the integer values of x and y which satisfy the 4 inequalities and provide the greatest value of $x + 2y$.

Answer $x =$ _____ $y =$ _____ [2]

4) A DIY store sells two types of paving blocks: brown rectangular and green square.



Brown rectangular paving blocks cost £0.20 each.
Green square paving blocks cost £0.30 each.

The DIY store manager says that last week fewer than 4000 paving blocks were sold and more than £960 was taken from sales of paving blocks.

Let B represent the number of brown rectangular paving blocks sold.
Let G represent the number of green square paving blocks sold.

- (a) Write down two inequalities, in terms of B and G , that satisfy the information given by the DIY store manager. [2]

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- (b) Use the graph paper opposite to find a region that is satisfied by your inequalities. You must clearly indicate your region. [3]

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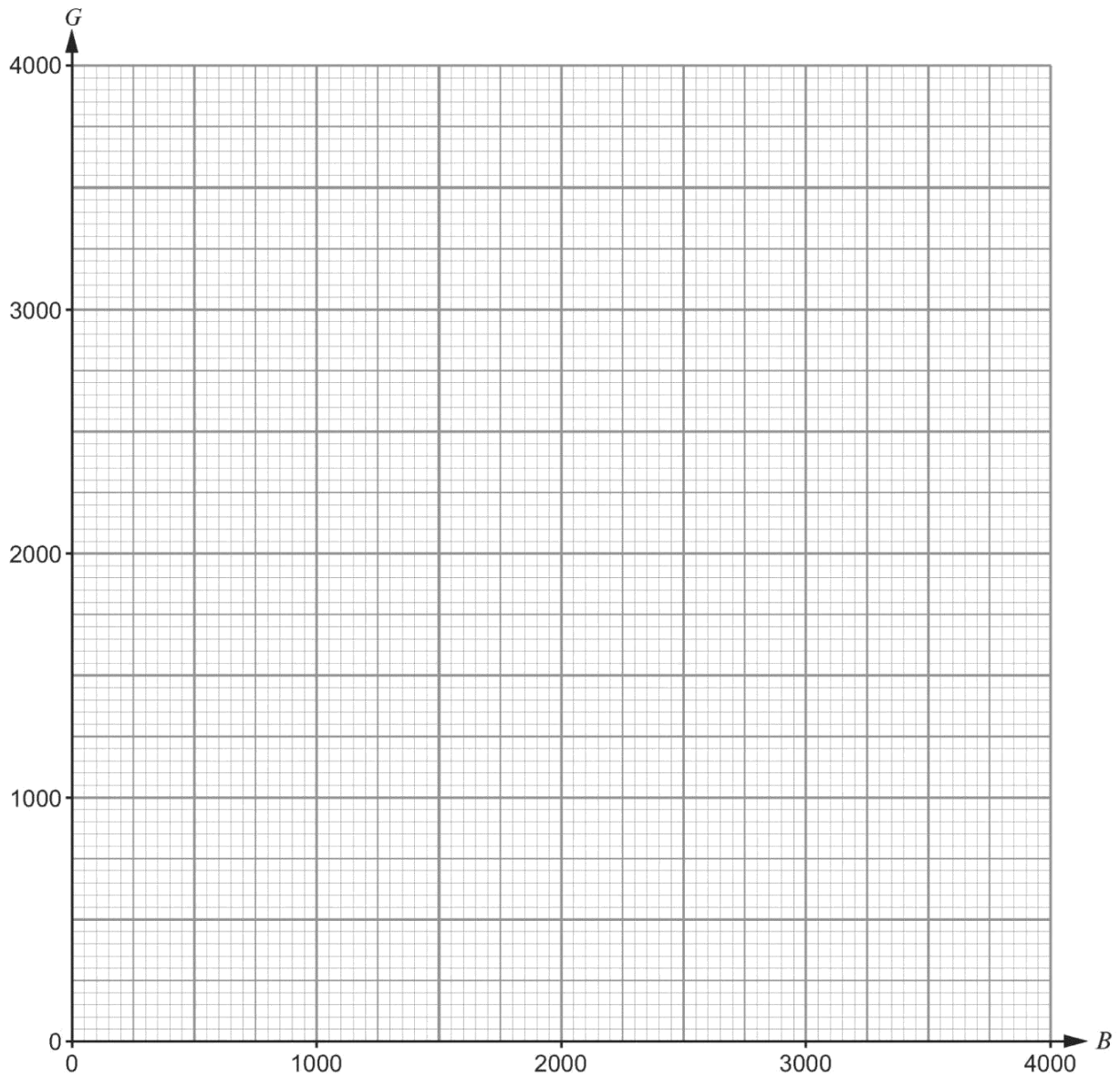
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(c) Here are some statements made by sales assistants about the sales of paving blocks last week.

Ifor said, "1500 brown and 2000 green were sold."

Simone said, "500 brown and 3000 green were sold."

Use your graph to complete the following table to indicate whether each statement could be true or not.

You **must show on your graph** how you justify your decisions.

[2]

Name	Statement	Could be true? Yes or No
Ifor	1500 brown and 2000 green were sold	
Simone	500 brown and 3000 green were sold	

5) A garden centre sells plastic plant pots and saucers.



Plant pots cost £0.45 each.



Saucers cost £0.20 each.

The garden centre manager says that last week

- the total number of plant pots and saucers sold was less than 3500 and
- more than £500 was taken from sales of plant pots and saucers.

Let P represent the number of plant pots sold.

Let S represent the number of saucers sold.

- (a) Write down two **inequalities**, in terms of P and S , that satisfy the information given by the garden centre manager. [2]

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- (b) Use the graph paper opposite to find a region that is satisfied by your inequalities. You must clearly indicate your region. [3]

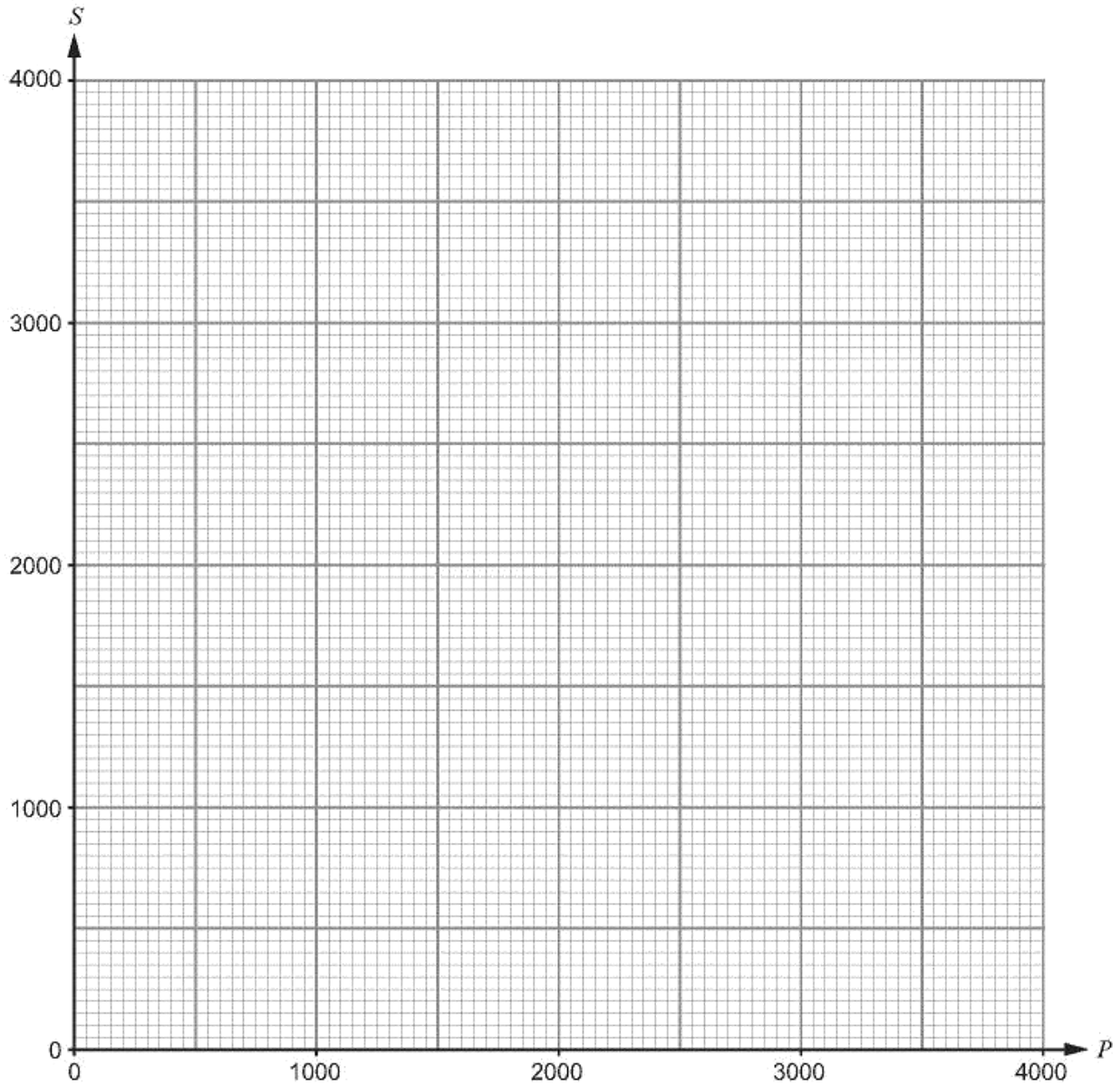
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(c) The following statement was made by a sales assistant about the sales of plant pots and saucers last week.

"800 plant pots and 1500 saucers were sold."

Use your graph to complete the following table to indicate whether the statement could be true or not.

You must show on your graph how you justify your decision.

[1]

Statement	Could be true? Yes or No
800 plant pots and 1500 saucers were sold

- 6) A hotel is planning to buy some new desks and chairs for their conference room.
The desks cost £125 each and chairs cost £50 each.

The manager says that the hotel needs more than 100 chairs.
She has a maximum of £8000 to spend.

Let D represent the number of desks.

Let C represent the number of chairs.

- (a) Write down two inequalities, in terms of D and C , that satisfy the information given by the hotel manager. [2]

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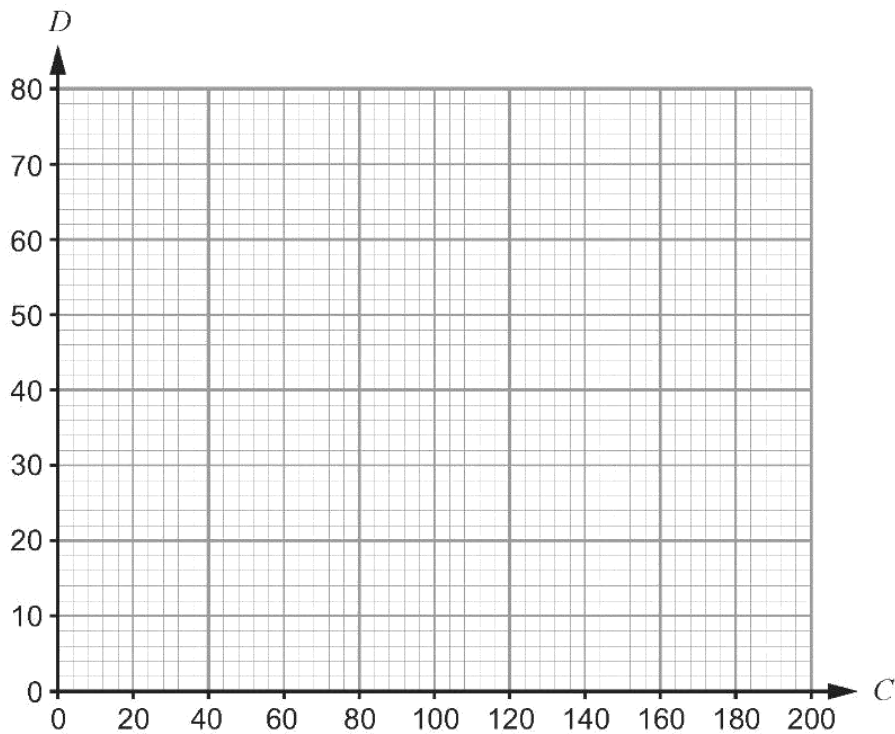
- (b) Use the graph paper opposite to find a region that is satisfied by your inequalities.
You must clearly indicate your region. [3]

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(c) Here is a statement made by the manager.

We could buy 150 chairs and 10 desks, or we could buy 110 chairs and 15 desks.

Use your graph to complete the following table to indicate whether each part of the statement could be true or not.

You **must show on your graph** how you justify your decisions.

[1]

	True or False?
We could buy 150 chairs and 10 desks.	
We could buy 110 chairs and 15 desks.	

7) A garden centre in the USA sells two types of spades.



Rounded-end spades cost \$40 and the pointed-end spades cost \$65

The garden centre manager says that last weekend fewer than 45 spades were sold and more than \$1560 was taken from sales of spades.

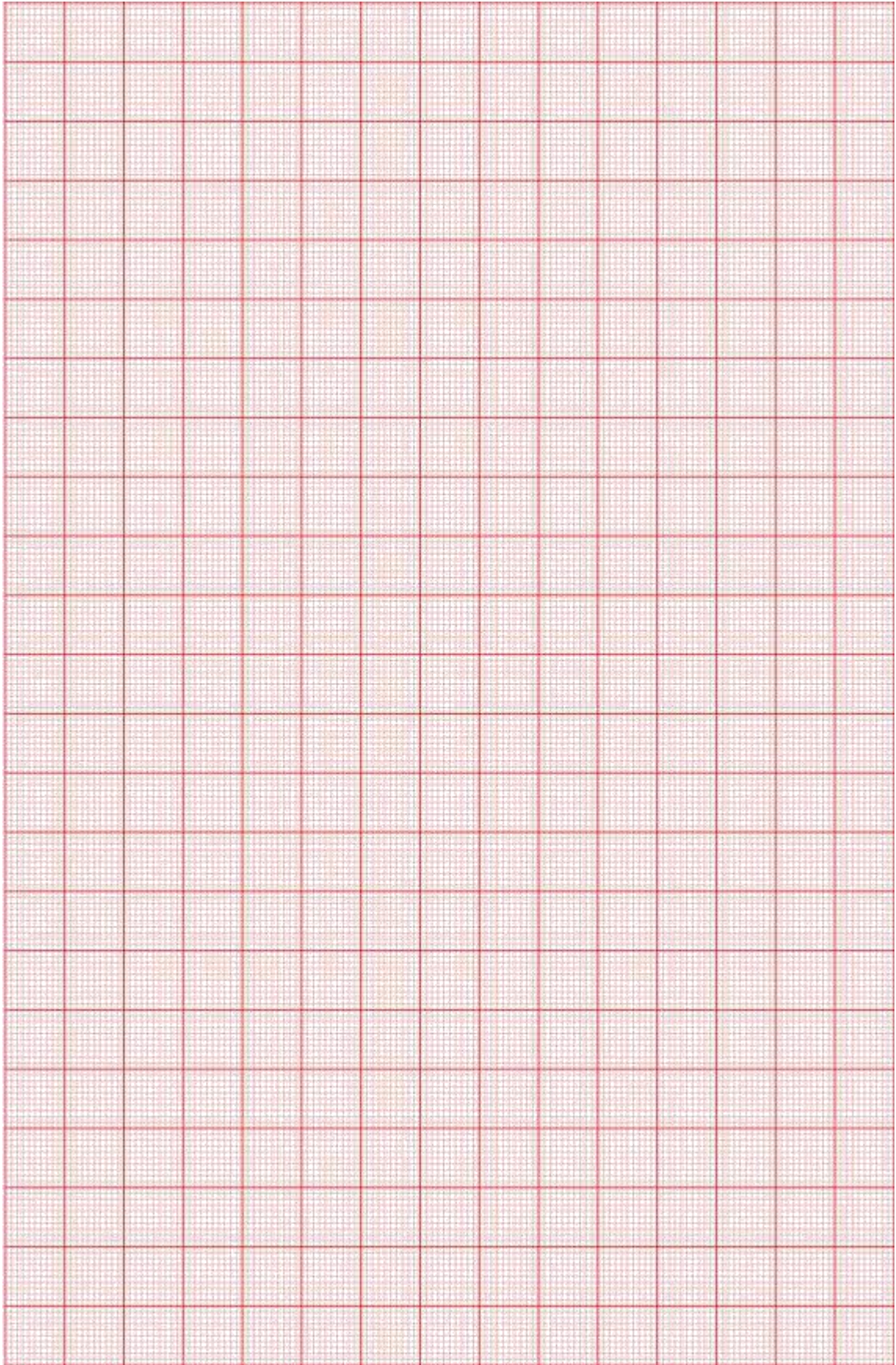
Let R represent the number of rounded-end spades sold and let P represent the number of pointed-end spades sold.

a) Write down two inequalities, in terms of R and P that satisfy the information given by the garden centre manager.

[2]

b) Use the graph paper opposite to find a region that is satisfied by your inequalities. You must clearly indicate your region.

[3]



- 8) A restaurant needs some new pieces of crockery.
The crockery the restaurant needs are dishes and plates.



The dishes and plates are available to buy in packs.
There are 3 dishes or 2 plates in each pack.
The restaurant cannot afford to buy more than 25 packs altogether.
The restaurant wants to buy at least 60 new pieces of crockery.

The information given can be represented by the inequalities,

$$\begin{aligned}d + p &\leq 25 \\ 3d + 2p &\geq 60\end{aligned}$$

where,

- d represents the number of packs of new dishes bought, and
- p represents the number of packs of new plates bought.

- (a) Use the graph paper opposite to find the region that is satisfied by the inequalities. [3]

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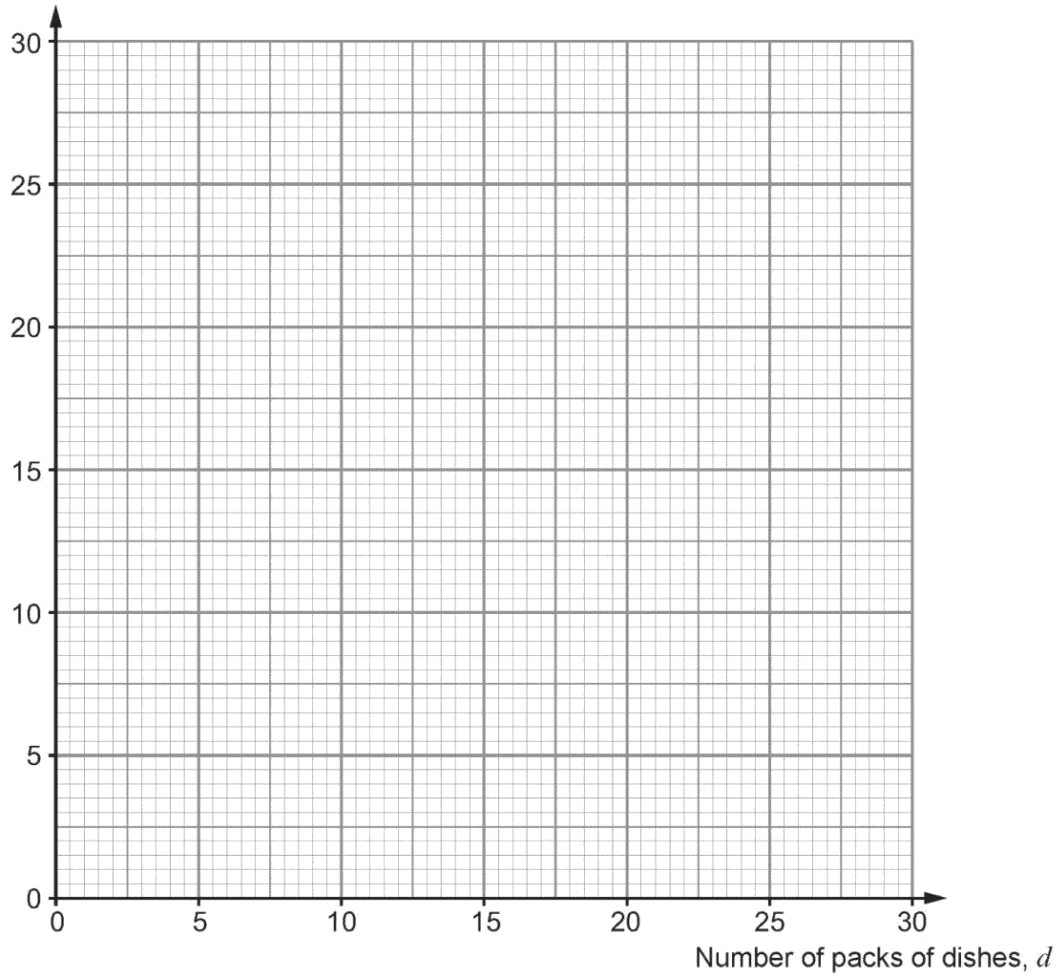
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Number of packs of plates, p



- (b) The restaurant decides to order some dishes **and** some plates.
 Complete the order form below by selecting a suitable number of packs of dishes and packs of plates for the restaurant to buy. [1]

Crockery	Number of packs to buy
Dishes	
Plates	

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- 9) Thelma owns a Guest House.
She wants to buy a number of rugs and cushions.



Each rug costs £30 and each cushion costs £4.

Thelma has decided on some conditions.

- She wants to buy at least 5 rugs.
- The number of cushions she buys must be less than twice the number of rugs she buys.
- She has a budget of £300.

Let r represent the number of rugs and let c represent the number of cushions.

- (a) Write down three inequalities that satisfy Thelma's conditions. [4]

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- (b) Use the graph paper opposite to find the region that is satisfied by all three inequalities. [4]

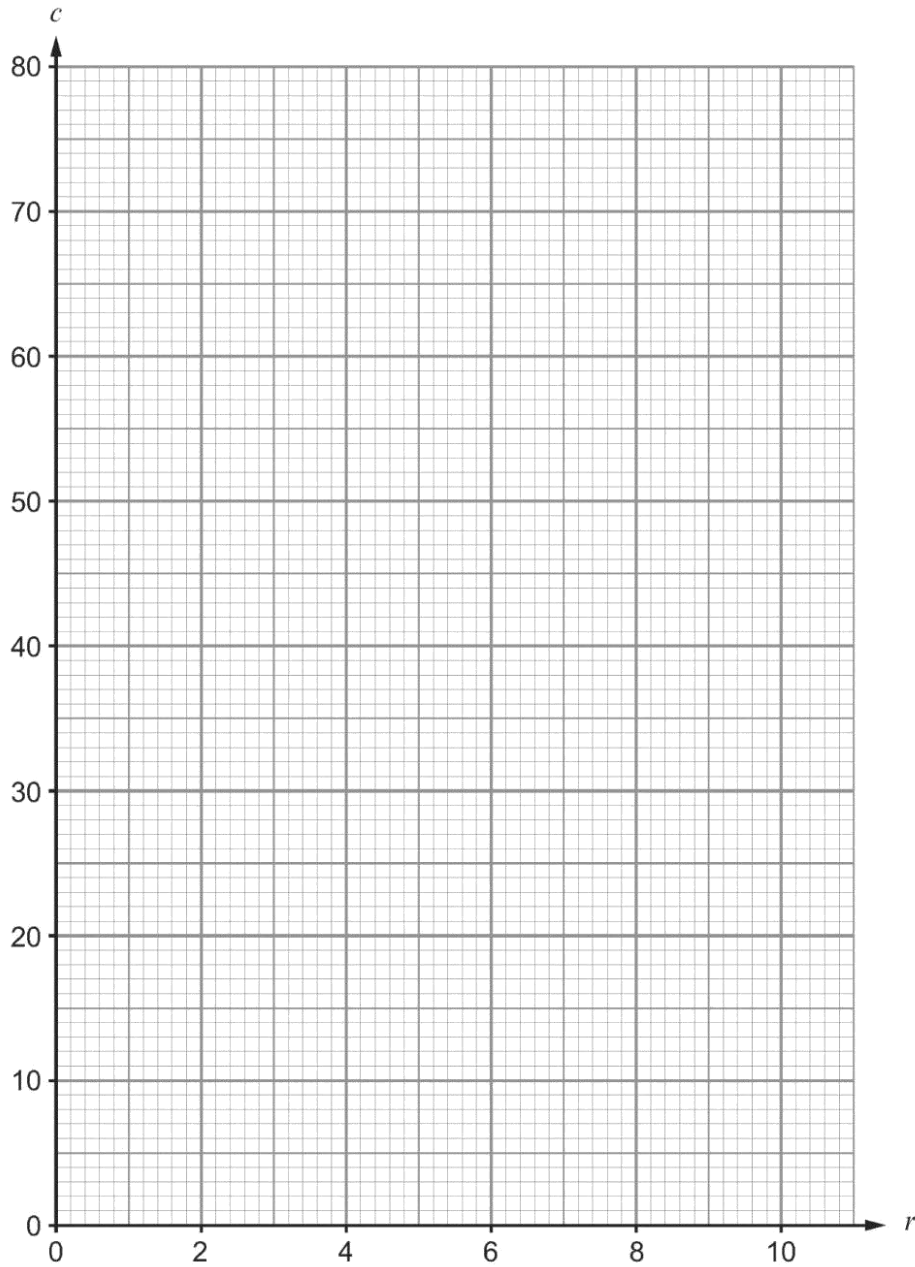
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(c) Thelma buys the maximum possible number of cushions, keeping to her conditions. Find the number of rugs and cushions she buys and the total cost. [2]

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Number of rugs =

Number of cushions =

Total cost = £