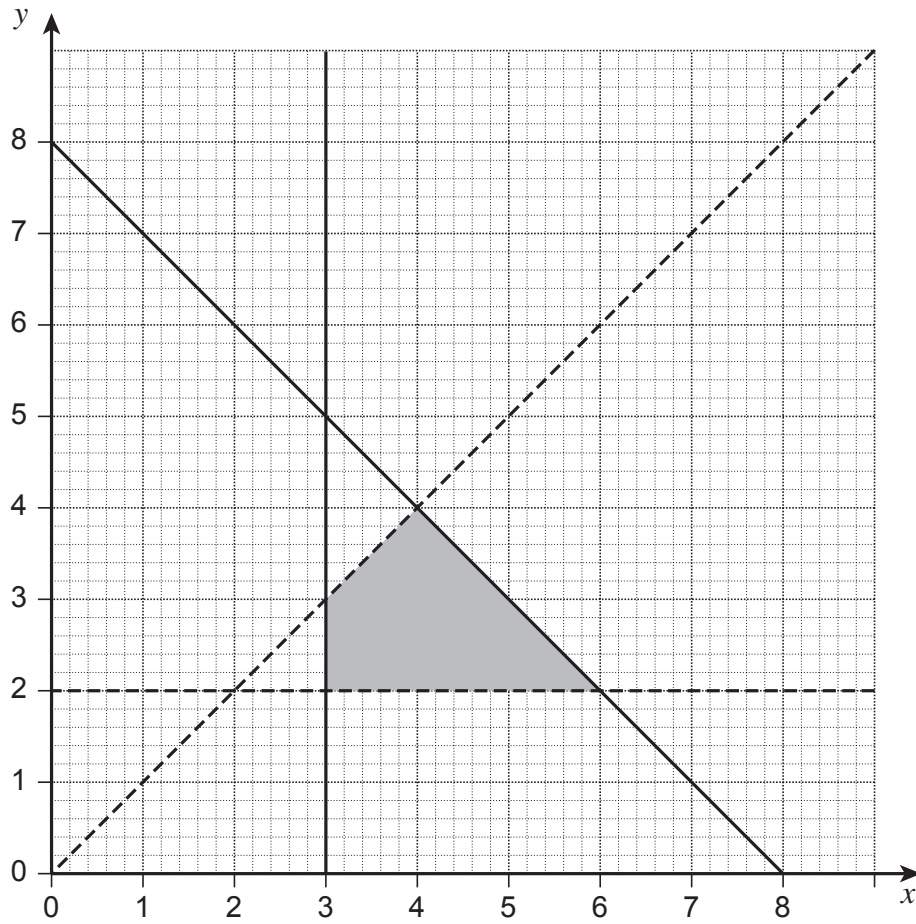


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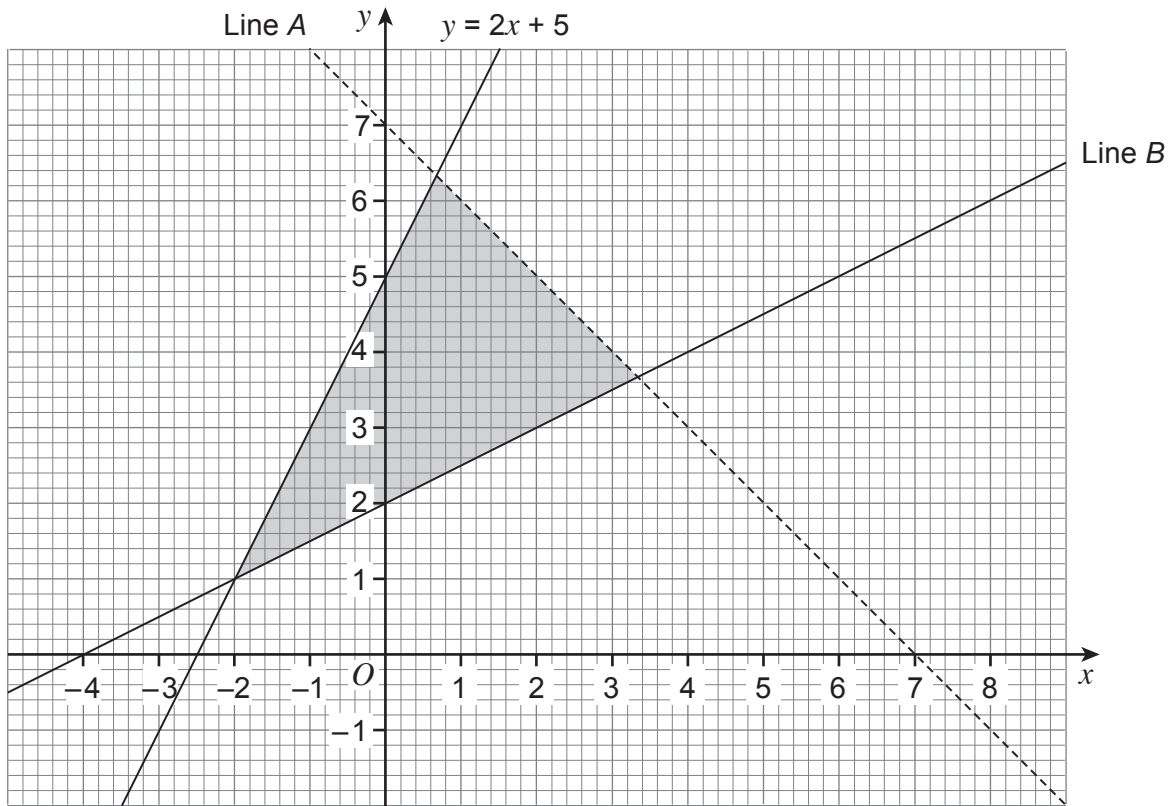
Use inequalities to describe the shaded area on the grid.



[ma rks]

6 Points in the shaded region satisfy three inequalities.

One of the inequalities is $y \leq 2x + 5$



13 (a) Circle the inequality with boundary line A.

[1 mark]

$x + y \geq 7$

$x + y < 7$

$x + y \leq 7$

$x + y > 7$

13 (b) Circle the inequality with boundary line B.

[1 mark]

$2y \geq x + 4$

$2y \leq x + 4$

$y \geq x + 2$

$y \leq x + 2$

7 The area of a plot of land is 4500 m^2 .
A builder wants to build up to 20 properties on this land.
One house (h) covers an area of 150 m^2 .
One bungalow (b) covers an area of 250 m^2 .

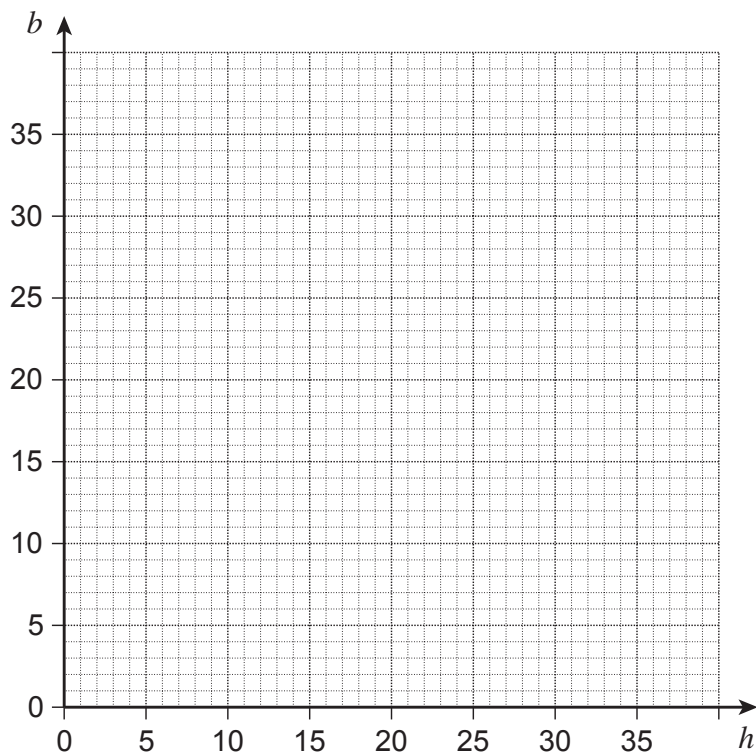
7 (a) (i) Show that $3h + 5b \leq 90$.

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(1 mark)

7 (a) (ii) Write down another inequality that involves h and b .

.....
Answer (1 mark)

- 7 (b) The builder makes £35 000 profit on each house and £50 000 profit on each bungalow. Complete the graph and use it to work out the maximum profit the builder can make.



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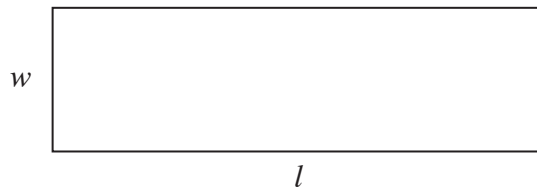
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Answer £ (4 marks)

8 In this question all lengths are in centimetres.

A rectangle has length l and width w .



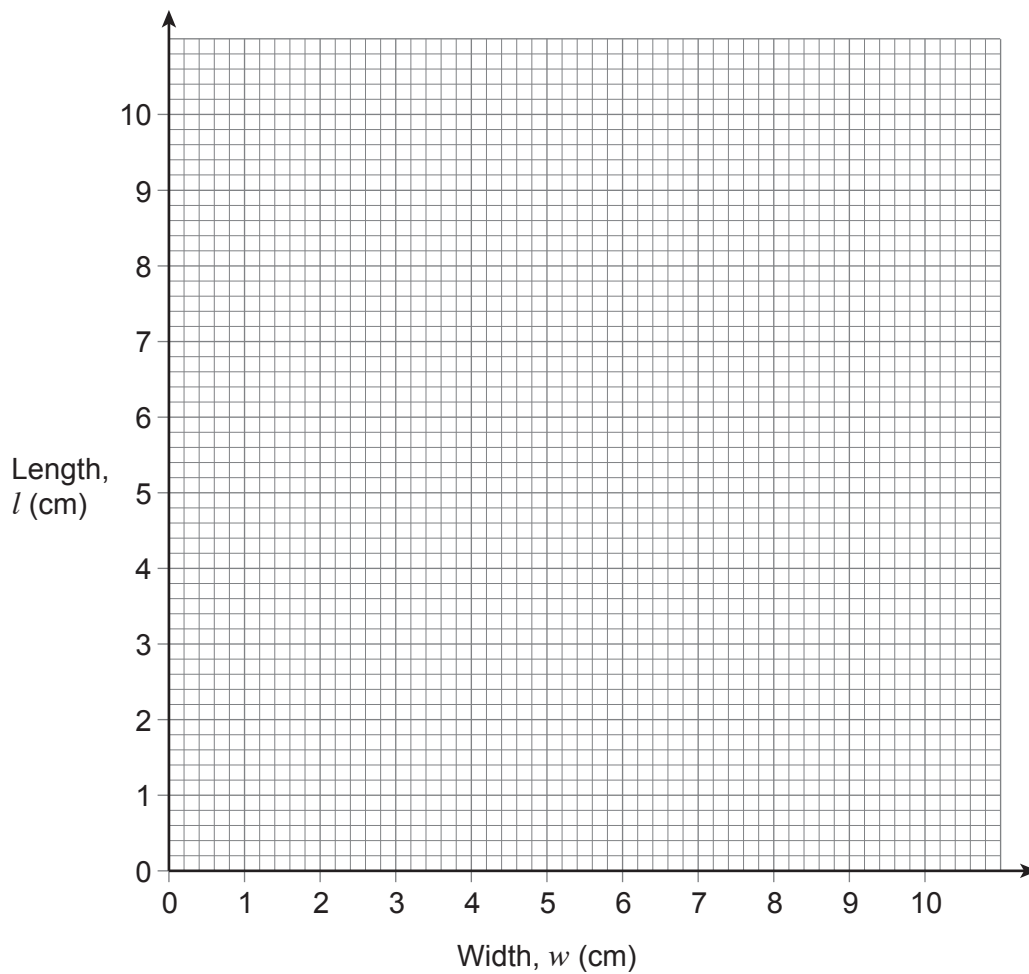
Not drawn accurately

8 (a) w and l are such that

$$1 \leq w \leq 9 \quad w + l = 10$$

Show this information on the graph.

[2 marks]



8 (b) Use the graph, or otherwise, to work out the value of w when $l = 3w$.
You **must** show your working.

[2 marks]

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.....

Answer

13

Points in the shaded region satisfy three inequalities.

One of the inequalities is $y \leq 5$

Which of these are the other **two** inequalities?

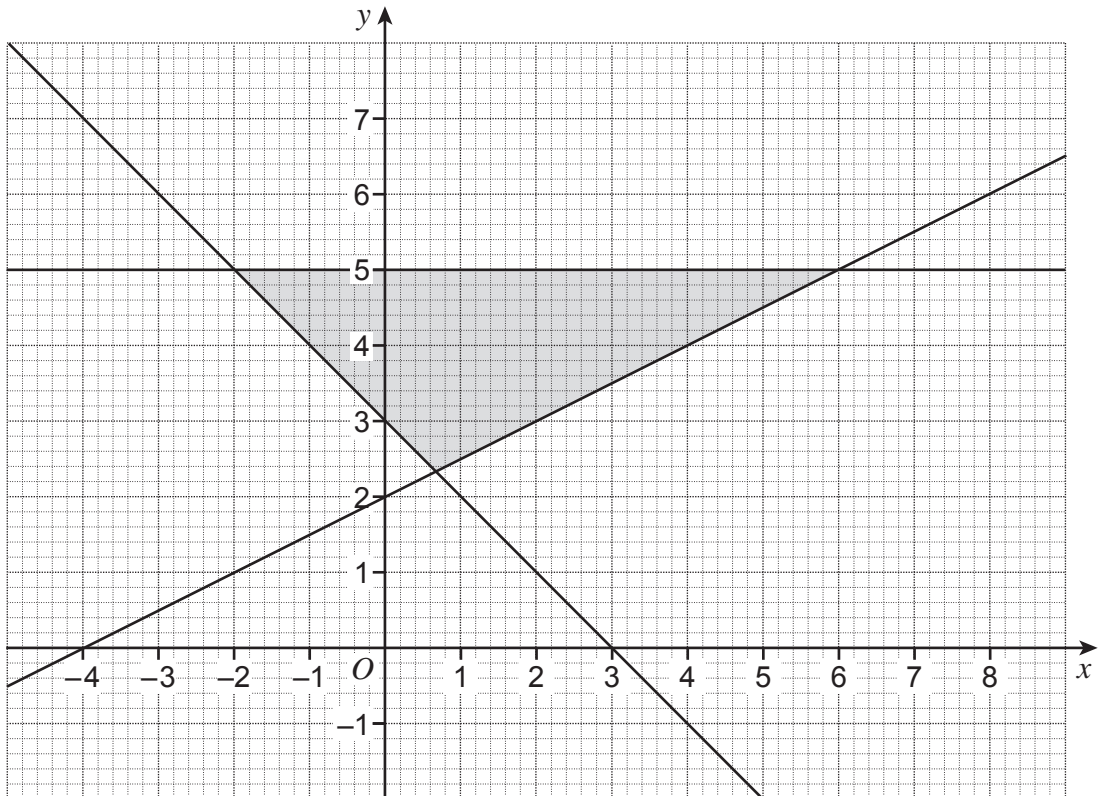
A $2y \geq x - 4$

B $x + y \geq 3$

C $y \geq 2x + 4$

D $2y \geq x + 4$

E $x + y \leq 3$



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Answer and (2 marks)

16 A shopkeeper is going to sell dishwasher tablets.
He decides to order two types of tablet, Dazzle and Supreme.
He wants to order at least twice as many boxes of Dazzle as Supreme.

16 (a) An inequality for this information is $d \geq 2s$

Explain what the letters d and s represent.

[1 mark]

16 (b) The shopkeeper will order no more than 20 boxes of tablets.

Use this information to write down another inequality for d and s .

[1 mark]

16 (c) Use the grid opposite to show the region that represents all the information.

[3 marks]

16 (d) The shopkeeper makes a profit of
80p on each box of Dazzle sold
£1.10 on each box of Supreme sold.

Use your graph to work out the number of boxes of each type of dishwasher tablet he should order to make the maximum profit.

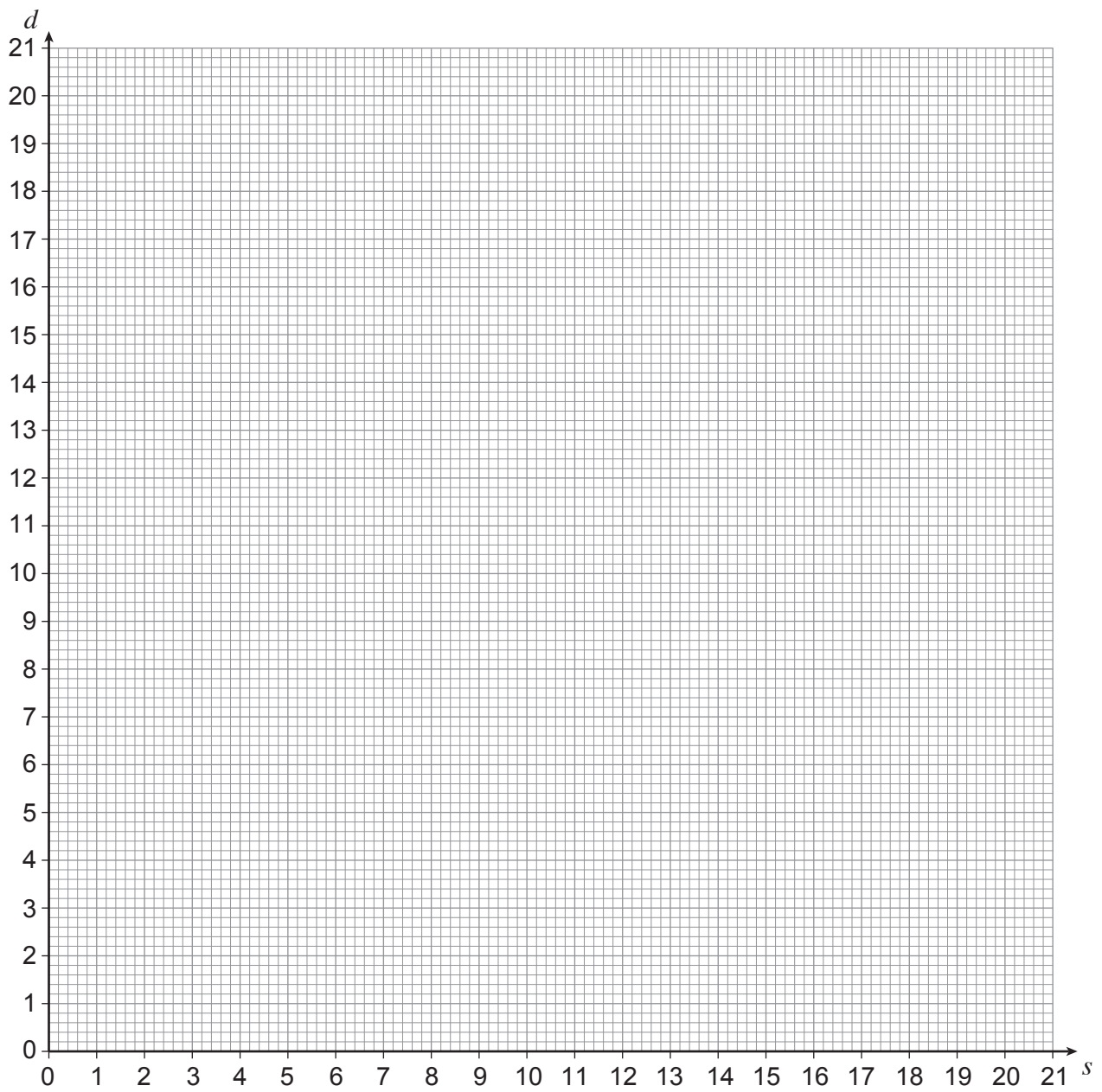
Work out the maximum profit.

[3 marks]

Supreme _____

Dazzle _____

Maximum profit £ _____



16 A company uses a coach to take adults and children on day trips to the seaside.
The coach will carry up to 36 passengers.
The fares charged are £5 per adult and £2.50 per child.
The company's takings from fares must be at least £75

Let x be the number of adults and y be the number of children.

16 (a) Show that $2x + y \geq 30$ **[1 mark]**

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16 (b) For a special family day trip to the seaside
there should be more children on the trip than adults
the number of children must not be more than twice the number of adults.

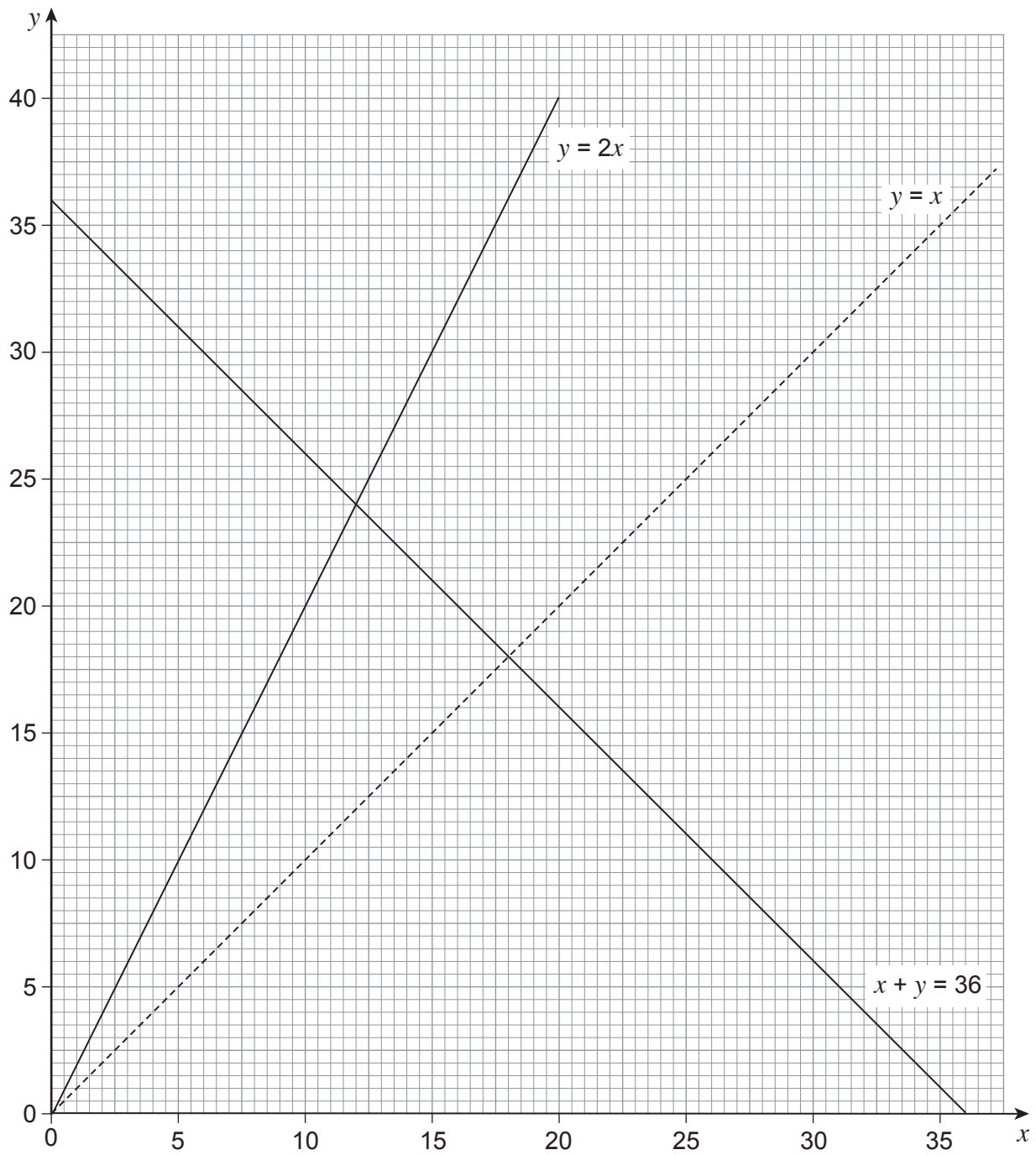
16 (b) (i) The lines $x + y = 36$, $y = x$ and $y = 2x$ are shown on the grid.
Show clearly on the graph the region satisfying **all four** conditions. **[2 marks]**

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16 (b) (ii) Use the graph to find the greatest possible amount that could be taken in fares for the trip.
You **must** show your working. **[3 marks]**

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Answer £



16 Robbie has two part-time jobs.

He mows lawns for at least 4 hours each week.

He delivers leaflets for at least 2 hours each week.

He is not allowed to work for more than 16 hours in total each week.

16 (a) Two inequalities for this information are

$$x \geq 4 \text{ and } y \geq 2$$

Explain what the letter symbols x and y represent.

[1 mark]

.....

.....

16 (b) Use the information to write down an inequality in x and y .

[1 mark]

Answer

16 (c) The line $x = 4$ is drawn on the graph opposite.

Complete the graph to show **all** of the information.

[3 marks]

16 (d) Robbie earns £6 per hour mowing lawns and £4.50 per hour delivering leaflets.

Can he earn over £100 in a week?

Explain your answer.

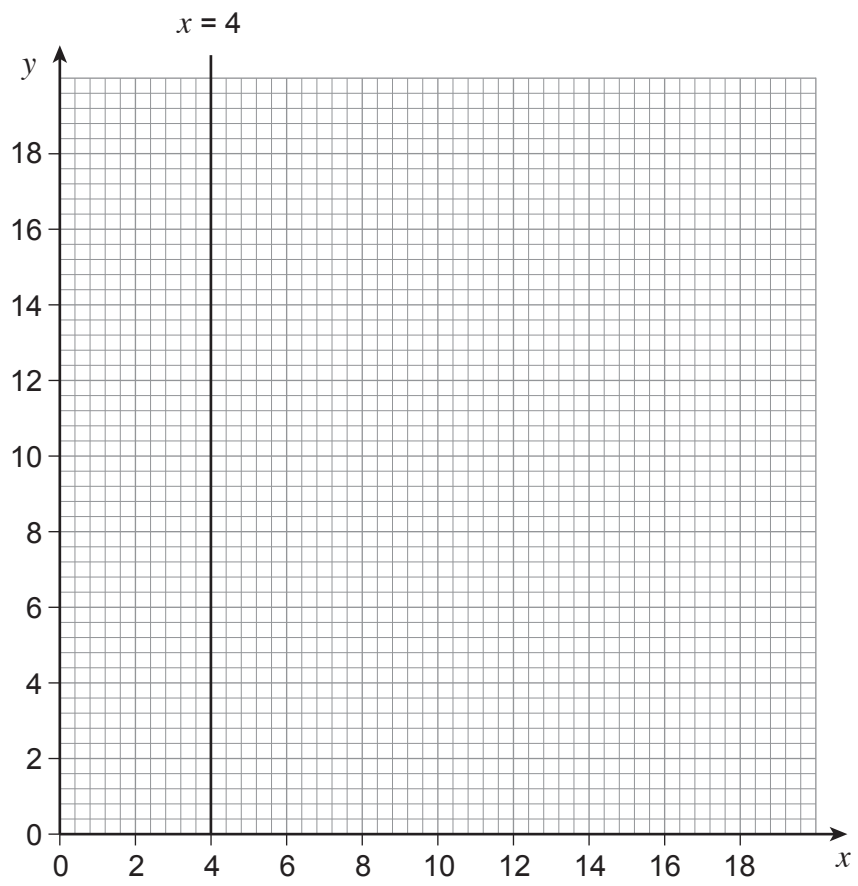
[2 marks]

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17 A garage owner starts a car rental business.
She buys small cars and medium sized cars.

Each small car costs £6000
Each medium car costs £8000
She wants to spend no more than £84 000

She buys at least 3 small cars.
She buys at least 2 medium cars.
She buys more small cars than medium cars.

Let the number of small cars be x .
Let the number of medium cars be y .

17 (a) Use the information about the costs of the cars to show that $3x + 4y \leq 42$ **[1 mark]**

.....
.....

17 (b) Show, by shading on the grid opposite, the region containing the possible number of cars of each type that she buys. **[1 mark]**

17 (c) The profit per day made on renting each small car is £20, and on renting each medium car is £24

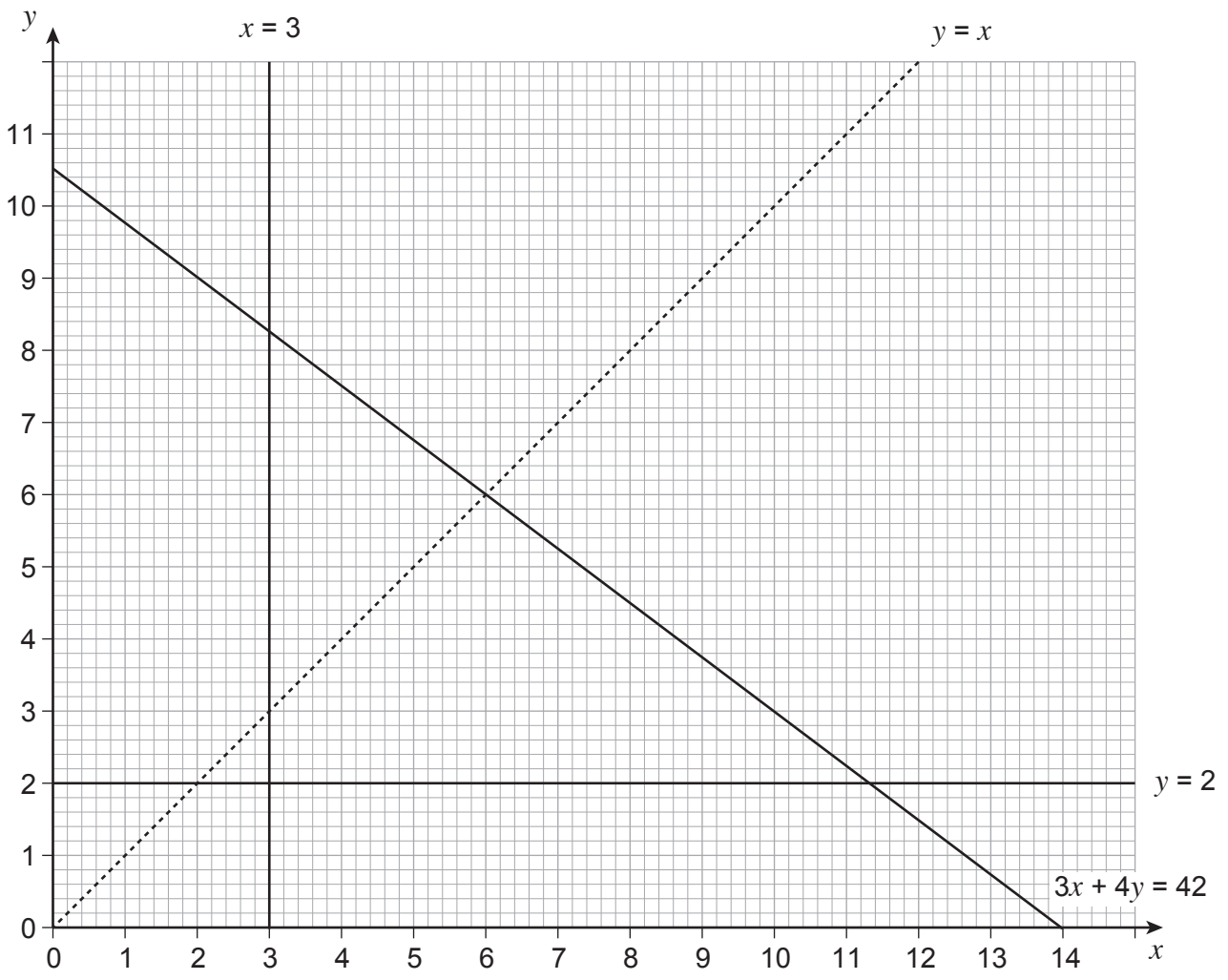
Work out the maximum profit per day and the number of cars of each type needed. **[3 marks]**

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Number of small cars

Number of medium cars

Maximum profit per day £



18 Mel has been given 84 balls of wool.
She decides to knit hats and scarves to raise money for charity.

A hat needs 3 balls of wool.
A scarf needs 6 balls of wool.

She decides to make

- at least 5 hats
- at least 5 scarves
- no more than 20 items altogether.

Let h be the number of hats made.
Let s be the number of scarves made.

18 (a) Use the information above to show that $h + 2s \leq 28$

[1 mark]

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.....

18 (b) Write down an inequality for the total number of items made.

[1 mark]

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.....

18 (c)

She sells each hat for £4.50

She sells each scarf for £7

The lines $h + 2s = 28$ and $s = 5$ are drawn on the graph below.

Complete the graph to show all the information and work out the maximum amount of money she can make.

[5 marks]

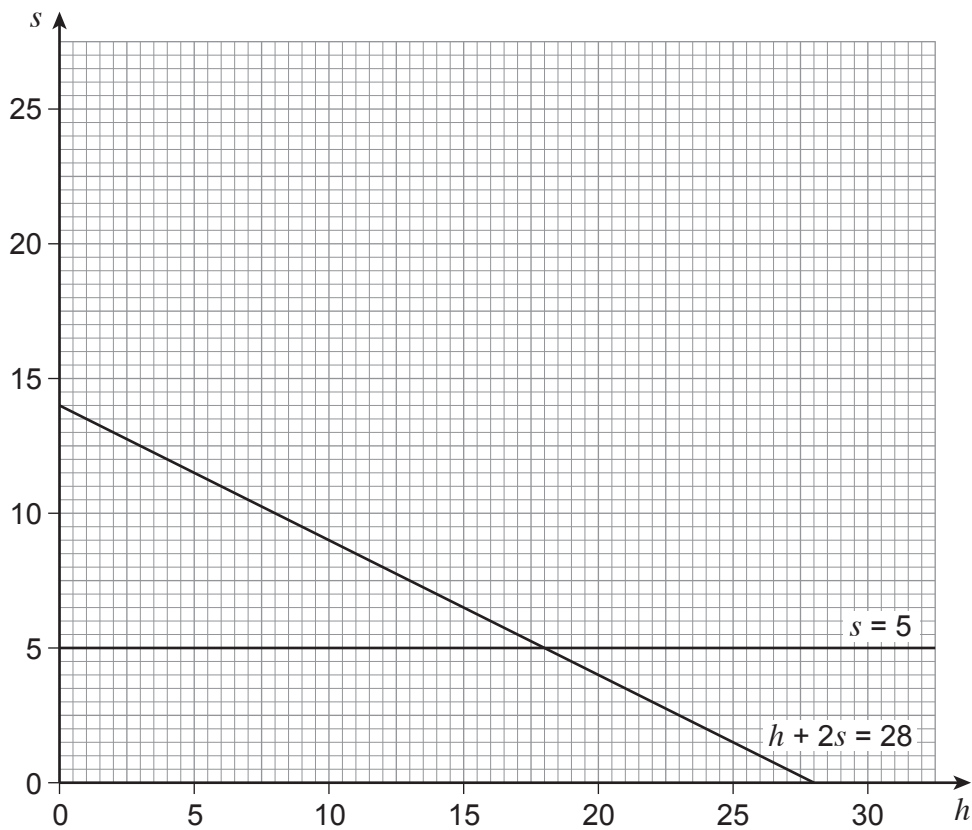
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£



15 A shopkeeper buys and sells oranges and grapefruit.
 She buys them in boxes.
 She has space for up to 16 boxes.
 She buys x boxes of oranges at £ 10 each.
 She buys y boxes of grapefruit at £ 30 each.
 She does **not** want to spend more than £ 300

15 (a) Use this information to show that $x + 3y \leq 30$

.....

 (1 mark)

15 (b) Write down another inequality that involves x and y .

.....
 Answer (2 marks)

15 (c) Each box of oranges is sold for £ 20
 Each box of grapefruit is sold for £ 50

The line $x + 3y = 30$ has been drawn on the grid opposite.

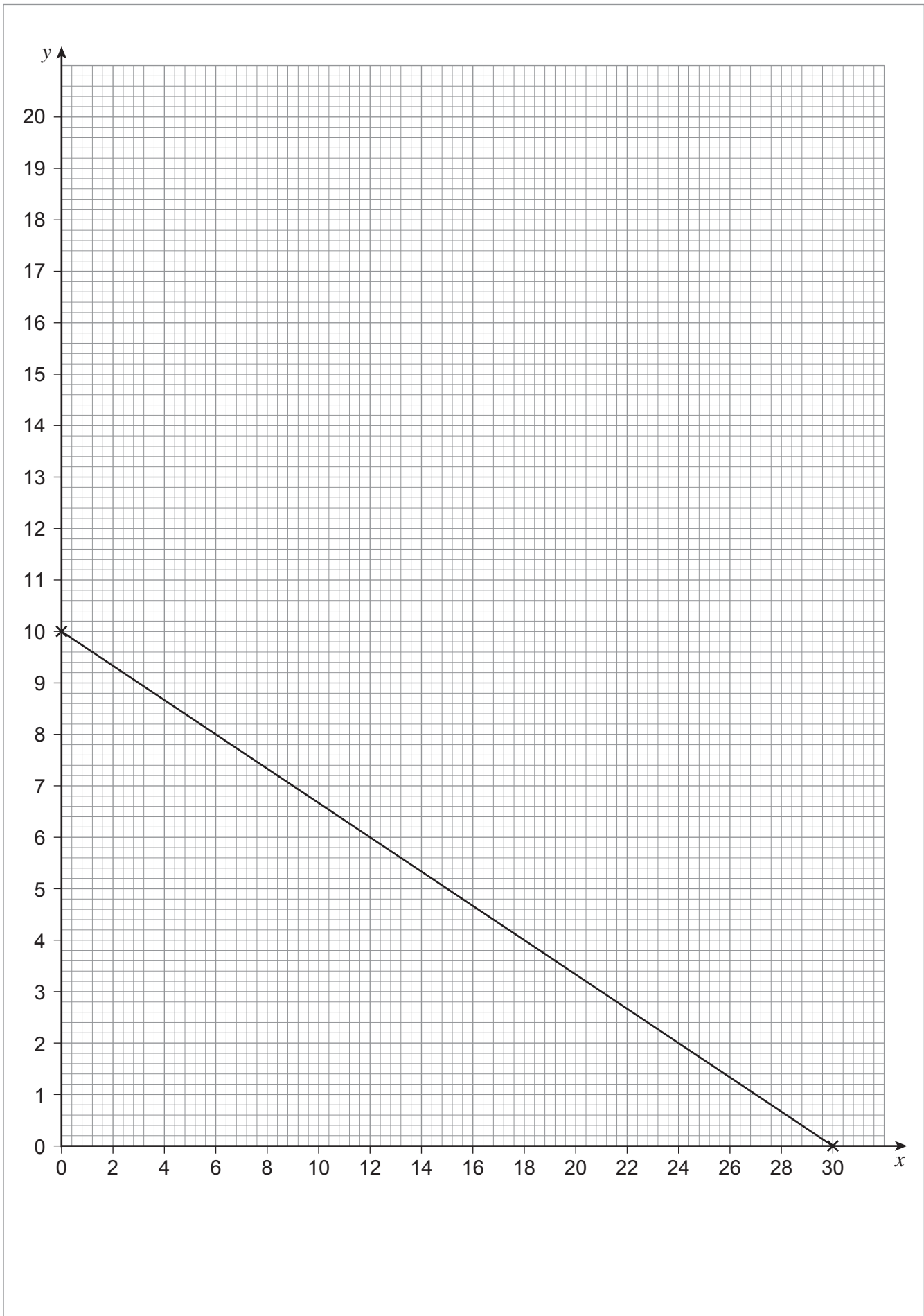
Use the graph to work out the number of boxes of each type of fruit that need to be sold to make the maximum profit, and hence find this profit.

.....

Number of boxes of oranges

Number of boxes of grapefruit

Profit £ (6 marks)



16 A potter makes bowls and jugs.

She has 20 kilograms of clay.
She uses 800 grams of clay for a bowl.
She uses 300 grams of clay for a jug.

She has 10 hours to make the bowls and jugs.
It takes her 8 minutes to make a bowl.
It takes her 12 minutes to make a jug.

Let the number of bowls made be x .
Let the number of jugs made be y .

16 (a) Use the information about the amount of clay to show that $8x + 3y \leq 200$

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(1 mark)

16 (b) Use the information about the time available to show that $2x + 3y \leq 150$

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(1 mark)

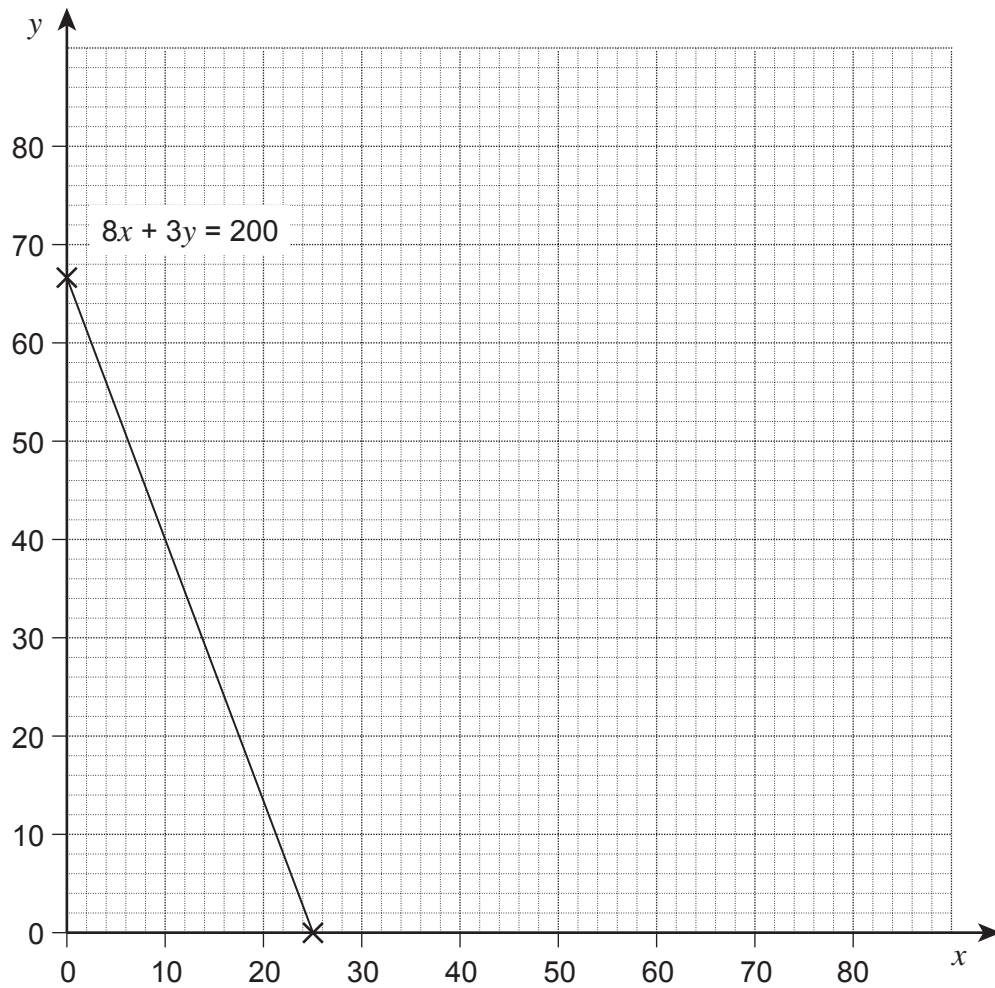
16 (c) The profit on a bowl is £7.
The profit on a jug is £4.

Work out the number of bowls and jugs the potter should make so that she makes the maximum profit.

The line $8x + 3y = 200$ has been drawn on the grid opposite to help you.

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Answer bowls jugs *(4 marks)*



12 A joiner makes two types of garden table.

Deluxe tables each cost £ 400 to make.
Economy tables each cost £ 200 to make.

She decides to

- spend no more than £ 3000
- make at least two of each type of table
- make no more than 10 tables altogether.

12 (a) One inequality for this information is $d + e \leq 10$

Explain what the letters d and e stand for.

.....
.....

(1 mark)

12 (b) Use the information above to show that $2d + e \leq 15$

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(1 mark)

12 (c) The joiner makes a profit of £ 80 on each deluxe table sold.
She makes a profit of £ 50 on each economy table sold.

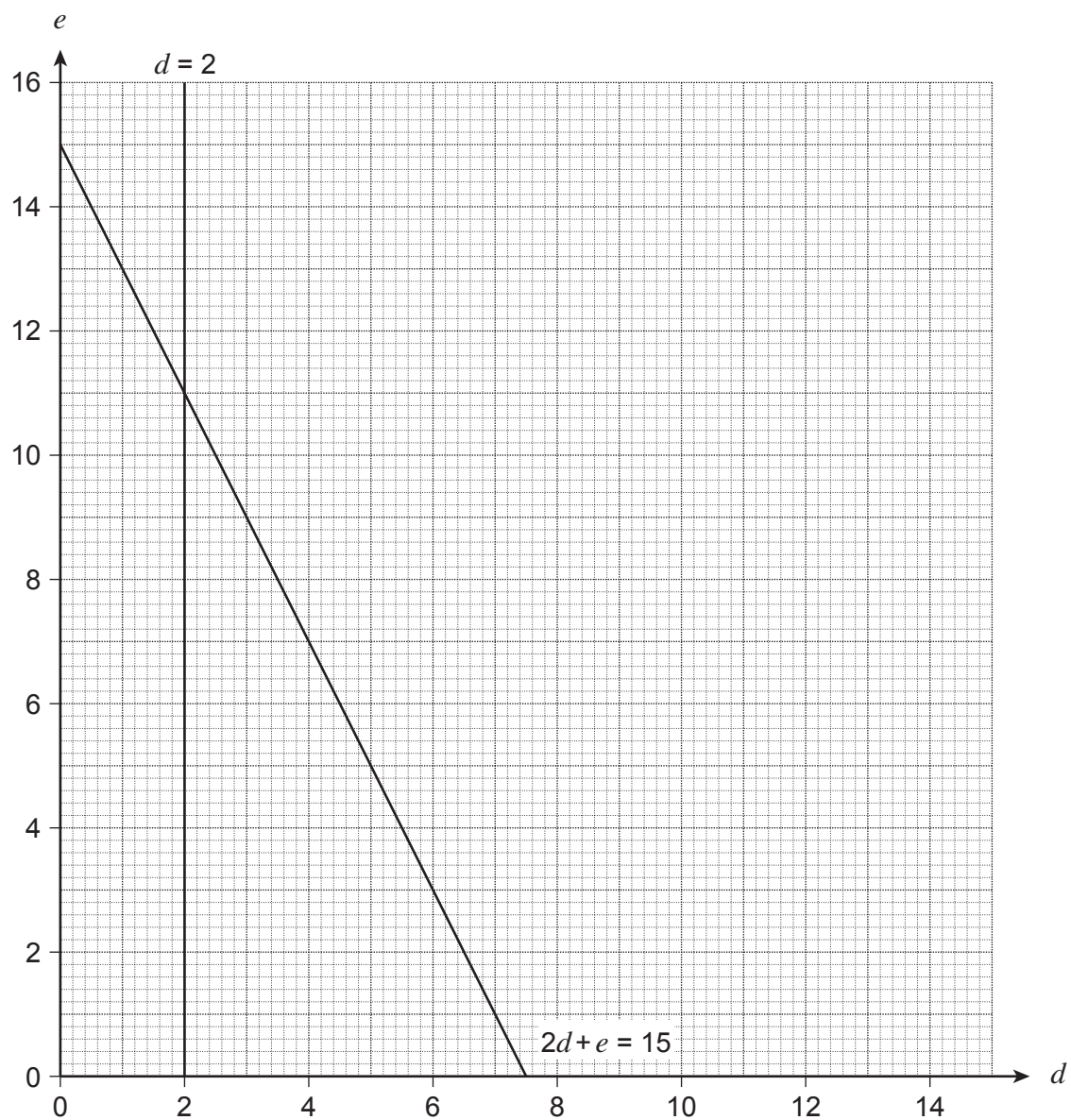
The lines $d = 2$ and $2d + e = 15$ are drawn on the graph opposite.

Complete the graph to show all the information and work out the maximum profit she can make.

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£

(5 marks)



END OF QUESTIONS

12 A company builds stools and chairs.
The table shows the times needed on the cutting machine and on the assembly line.

	Time on cutting machine	Time on assembly line
Stool	40 minutes	30 minutes
Chair	20 minutes	70 minutes

The cutting machine is available for 5 hours each day.
The assembly line is available for 7 hours each day.

Let the number of stools built be x .
Let the number of chairs built be y .

12 (a) Use the information about the assembly line to show that

$$3x + 7y \leq 42$$

.....

 (1 mark)

12 (b) Use the information about the cutting machine to write down another inequality in x and y .

.....
 Answer (2 marks)

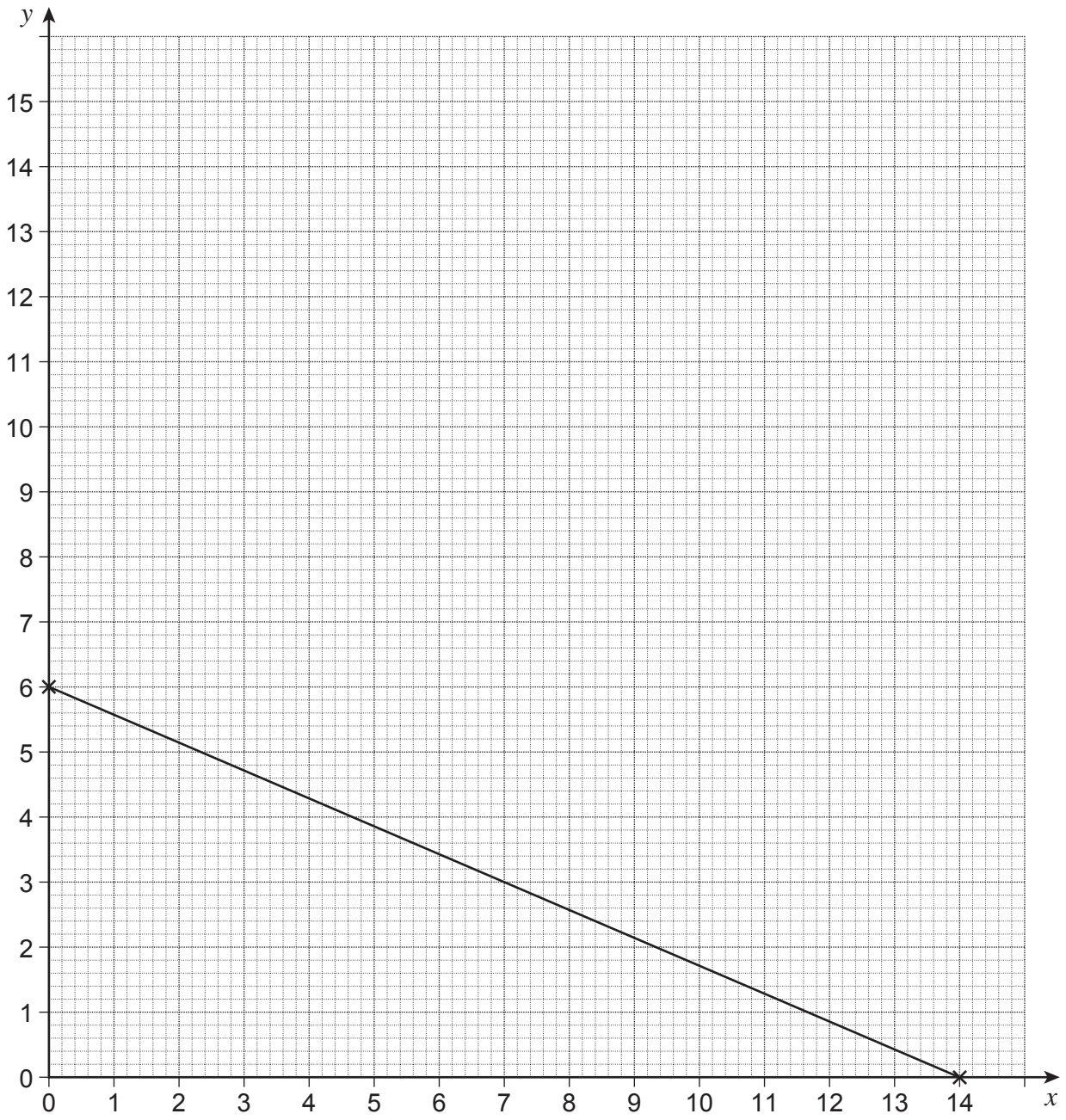
12 (c) The profit on a stool is £18.
The profit on a chair is £27.

Work out the number of stools and chairs that should be built per day so that the company makes the maximum profit.

The line $3x + 7y = 42$ has been drawn on the grid opposite to help you.

.....

Answer stools chairs



(4 marks)

13 A shop sells two types of garden seats.
Economy chairs cost £20 each and Recliners cost £50 each.
One day the computer, recording stock and sales, broke down.

Fewer than 25 garden seats were sold.
More than £800 was taken on sales of garden seats.

13 (a) One inequality for this information is $20e + 50r > 800$.

Explain what the letters e and r stand for.

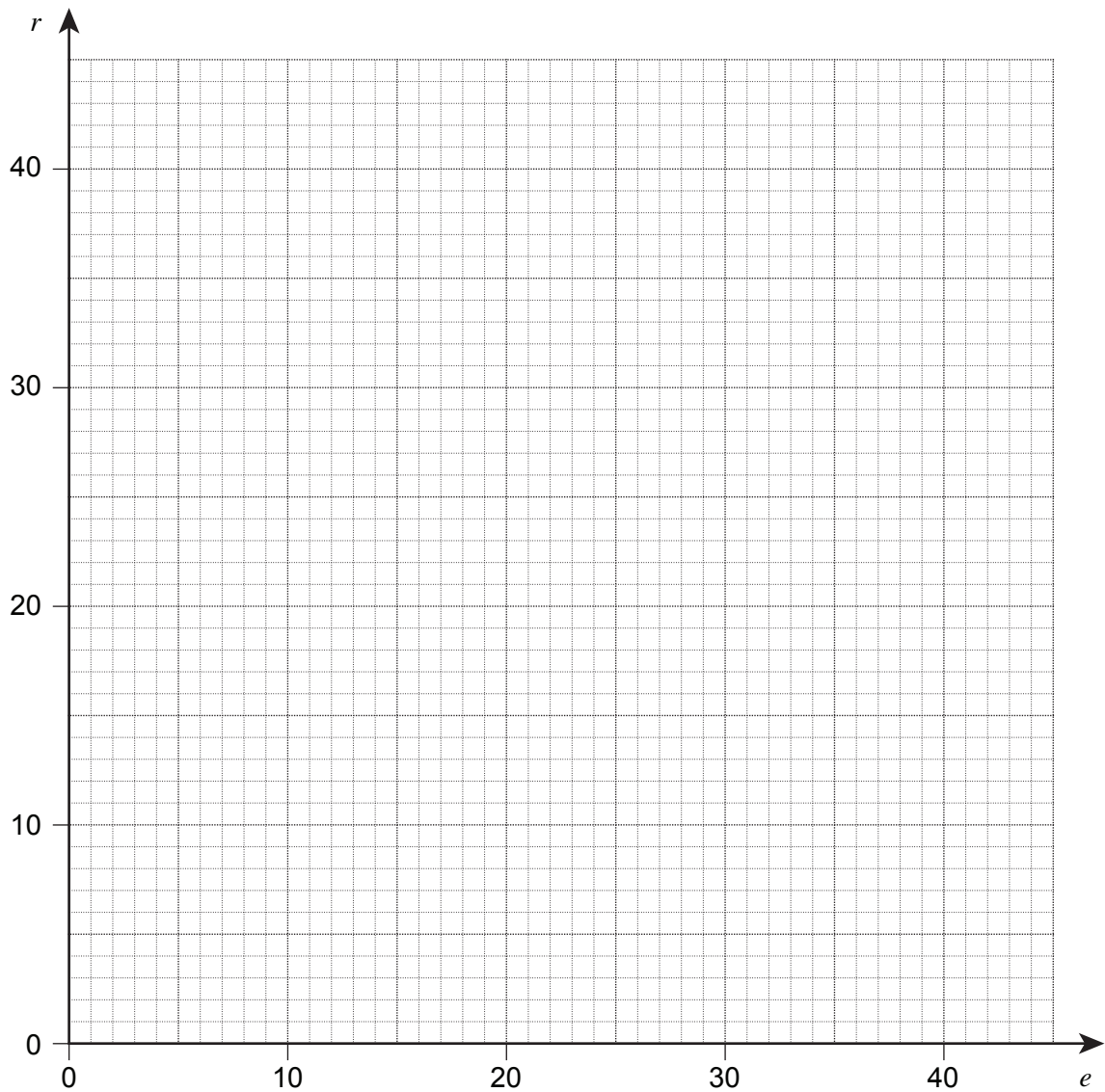
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(1 mark)

13 (b) Write down another inequality that involves e and r .

.....
Answer (1 mark)

13 (c) (i) Show the region that satisfies $20e + 50r > 800$ on the grid opposite.
Shade the side that does **not** satisfy the inequality.

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.....
.....
(3 marks)



13 (c) (ii) Show the region that satisfies your answer to part (b) on the same grid. Shade the side that does **not** satisfy the inequality.

.....

 (2 marks)

13 (d) What is the largest number of economy chairs that the shop could have sold? Remember to check that your answer satisfies the original conditions.

.....

 Answer (2 marks)