Graphical Inequalities Difficulty: Medium

Question Paper 1

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Graphical Inequalities
Paper	Paper 4
Difficulty	Medium
Booklet	Question Paper 1

Time allowed: **68 minutes**

Score: **/59**

Percentage: **/100**

Grade Boundaries:

CIE IGCSE Maths (0580)

A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980) ~~ASSembled by N-S~~

| 9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%

Ali buys x rose bushes and y lavender bushes.

He buys:
- at least 5 rose bushes
- at most 8 lavender bushes
- at most 15 bushes in total
- more lavender bushes than rose bushes.

(a) (i) Write down four inequalities, in terms of x and/or y, to show this information. [4]

(ii) On the grid, show the information in **part (a)(i)** by drawing four straight lines.
Label the region R where all four inequalities are true.

[5]

2
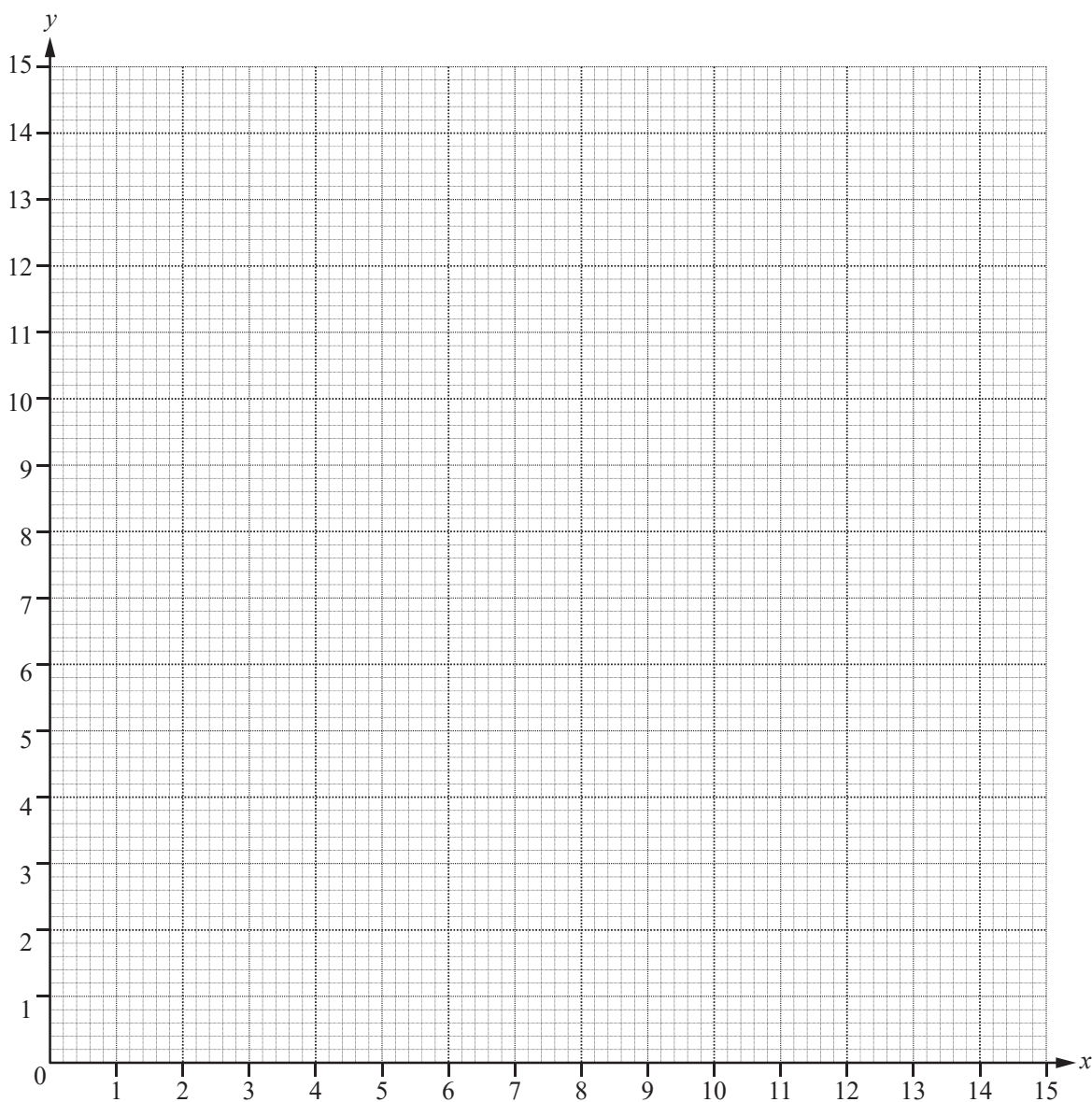
(b) Rose bushes cost $6 each and lavender bushes cost $4.50 each.

What is the greatest amount of money Ali could spend? [2]

The school cook buys potatoes in small sacks, each of mass 4 kg, and large sacks, each of mass 10 kg.
He buys x small sacks and y large sacks.
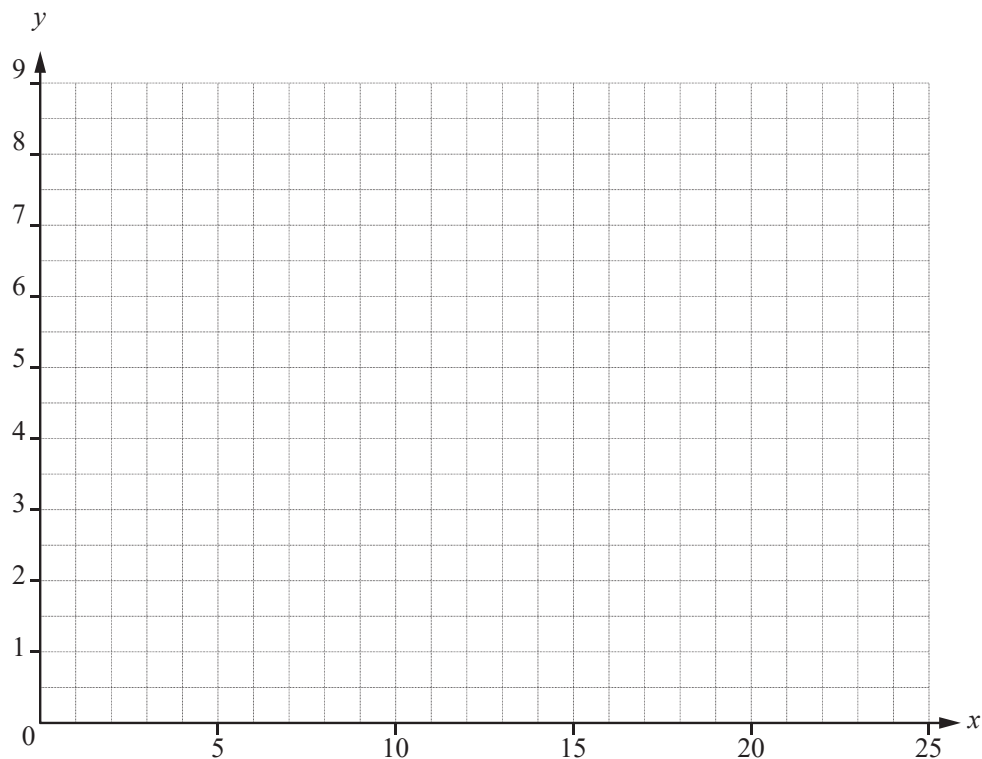Today, he buys less than 80 kg of potatoes.

(a)   Show that $2x + 5y < 40$.

[1]

(b)   He buys more large sacks than small sacks.
       He buys no more than 6 large sacks.

       Write down two inequalities to show this information.

[2]

(c)   On the grid, show the information in **part (a)** and **part (b)** by drawing three straight lines and shading
       the unwanted regions.

[5]

(d) Find the greatest mass of potatoes the cook can buy today.

[2]

(a) Luk wants to buy x goats and y sheep.

   (i)   He wants to buy at least 5 goats.

       Write down an inequality in x to represent this condition.   [1]

   (ii)   He wants to buy at least 11 sheep.

       Write down an inequality in y to represent this condition.   [1]

   (iii)   He wants to buy at least 20 animals.

       Write down an inequality in x and y to represent this condition.   [1]
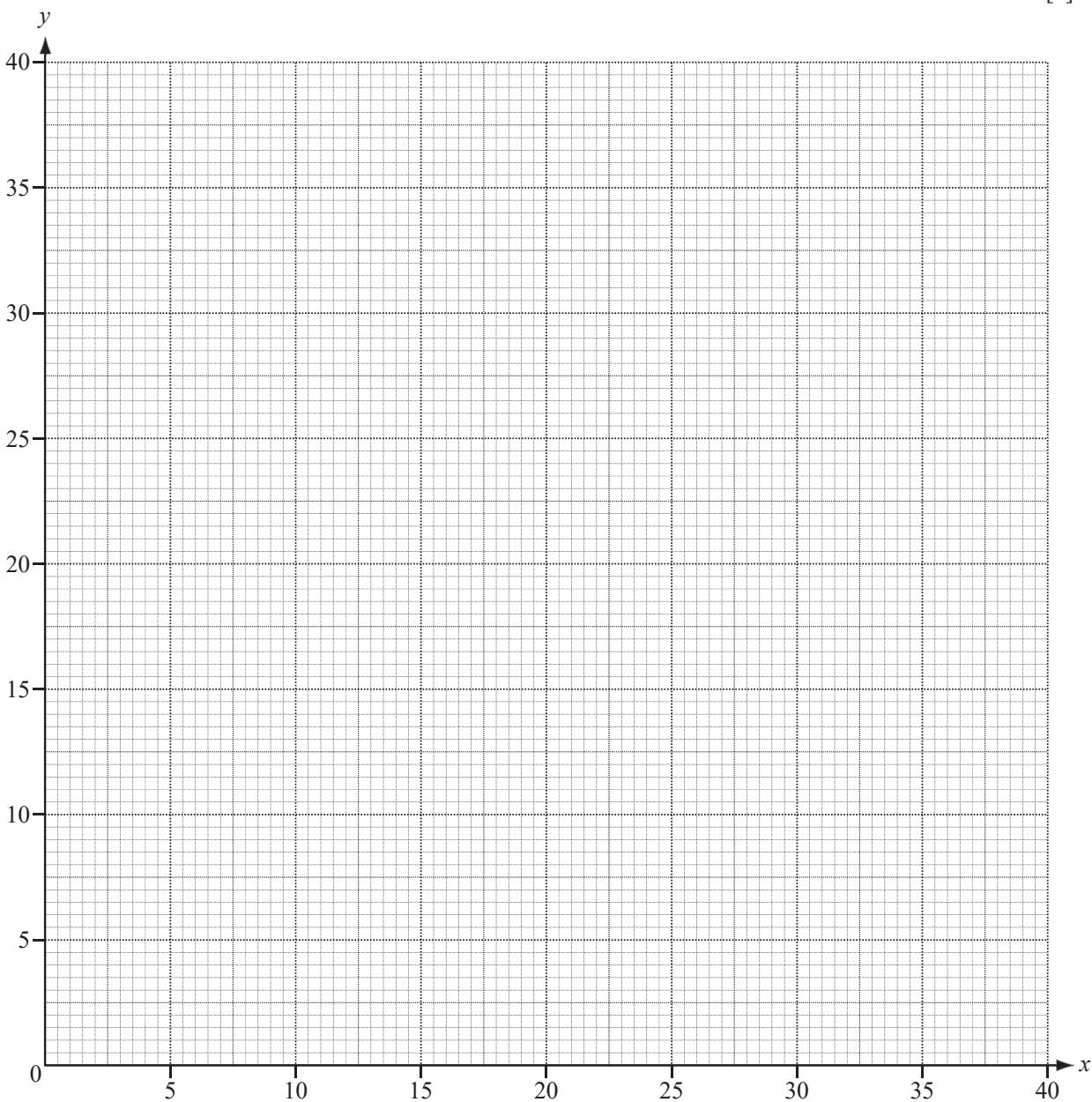
(b) Goats cost \$4 and sheep cost \$8.
   The maximum Luk can spend is \$160.

   Write down an inequality in x and y and show that it simplifies to $x + 2y \leq 40$.   [1]

(c) (i) On the grid below, draw four lines to show the four inequalities and shade the **unwanted** regions.

[7]

(ii) Work out the maximum number of animals that Luk can buy.

[2]

Jay makes wooden boxes in two sizes. He makes x small boxes and y large boxes.
He makes at least 5 **small** boxes.
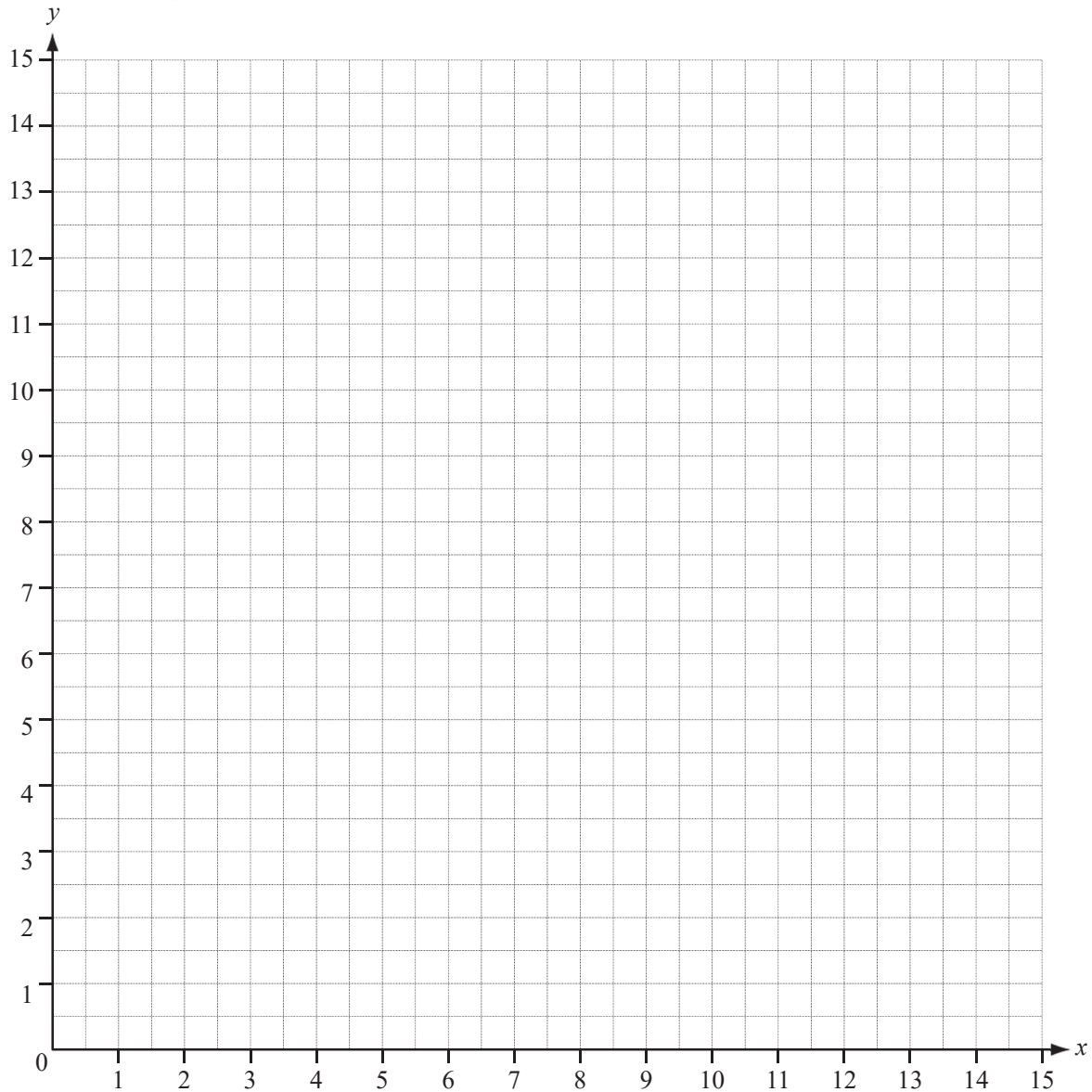The greatest number of **large** boxes he can make is 8.
The greatest total number of boxes is 14.
The number of large boxes is at least half the number of **small** boxes.

(a) (i) Write down four inequalities in x and y to show this information. [4]

(ii) Draw four lines on the grid and write the letter R in the region which represents these inequalities.

[5]

7

(b) The price of the small box is $20 and the price of the large box is $45.

(i) What is the greatest amount of money he receives when he sells all the boxes he has made?

[2]

(ii) For this amount of money, how many boxes of each size did he make? [1]

Peter wants to plant x plum trees and y apple trees.

He wants at least 3 plum trees and at least 2 apple trees.

(a) Write down one inequality in x and one inequality in y to represent these conditions. [2]

(b) There is space on his land for no more than 9 trees.

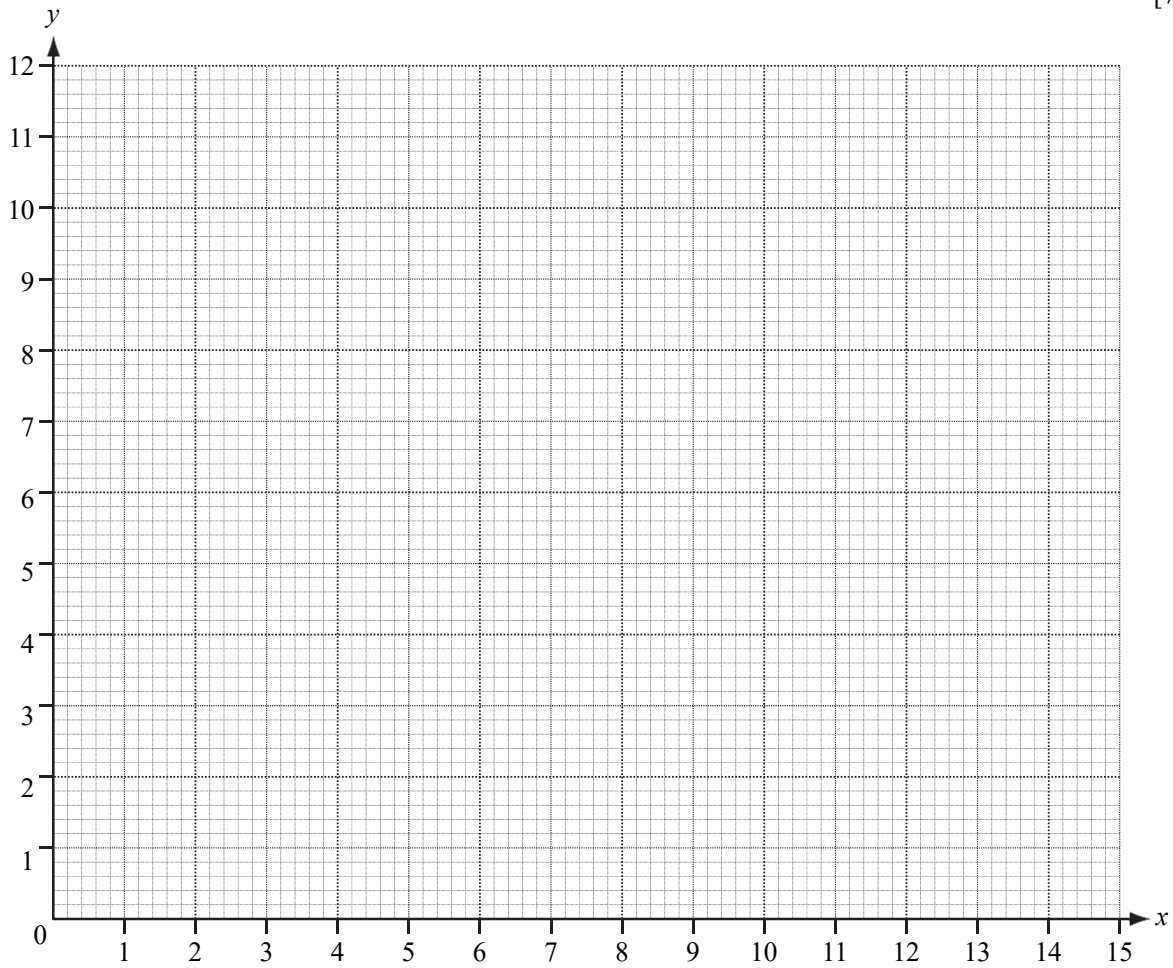Write down an inequality in x and y to represent this condition. [1]

(c) Plum trees cost $6 and apple trees cost $14.

Peter wants to spend no more than $84.

Write down an inequality in x and y, and show that it simplifies to $3x + 7y \leq 42$. [1]

(d) On the grid, draw four lines to show the four inequalities and shade the unwanted regions.

[7]

(e) Calculate the smallest cost when Peter buys a total of 9 trees. [2]

Graphical Inequalities Difficulty: Hard

Question Paper 1

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Graphical Inequalities
Paper	Paper 4
Difficulty	Hard
Booklet	Question Paper 1

Time allowed: **70 minutes**

Score: **/61**

Percentage: **/100**

Grade Boundaries:

CIE IGCSE Maths (0580)

A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980)

9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%

Pablo plants x lemon trees and y orange trees.

(a)   (i) He plants at least 4 lemon trees.

   Write down an inequality in x to show this information.   [1]

   (ii)   Pablo plants at least 9 orange trees.

   Write down an inequality in y to show this information.   [1]

   (iii)   The greatest possible number of trees he can plant is 20.

   Write down an inequality in x and y to show this information.   [1]

(b) Lemon trees cost $5 each and orange trees cost $10 each.

   The maximum Pablo can spend is $170.

   Write down an inequality in x and y and show that it simplifies to $x + 2y \leqslant 34.$ [1]

(c)   (i)   On the grid opposite, draw four lines to show the four inequalities and shade the **unwanted** region.
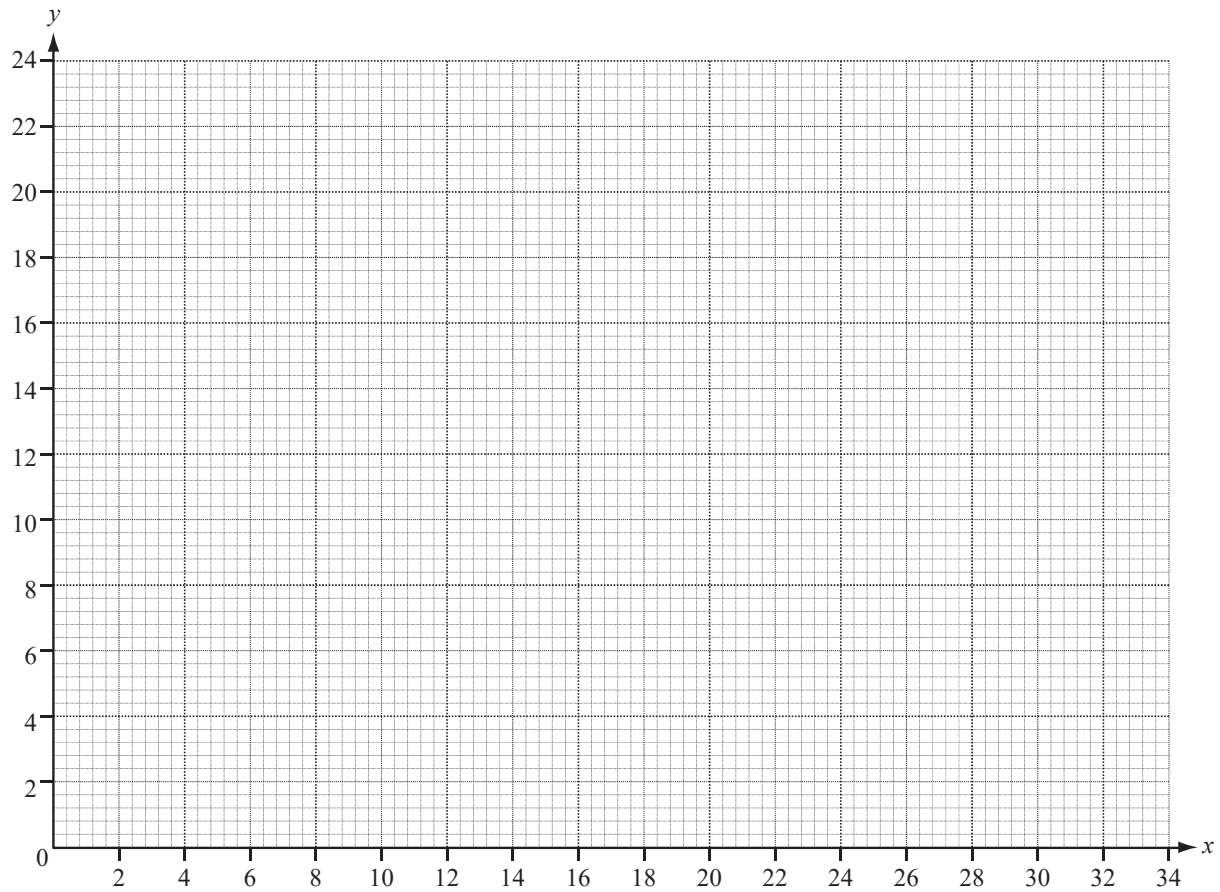
[7]

(ii) Calculate the smallest cost when Pablo buys a total of 20 trees. [2]

Mr Chang hires x large coaches and y small coaches to take 300 students on a school trip.
Large coaches can carry 50 students and small coaches 30 students.
There is a maximum of 5 large coaches.

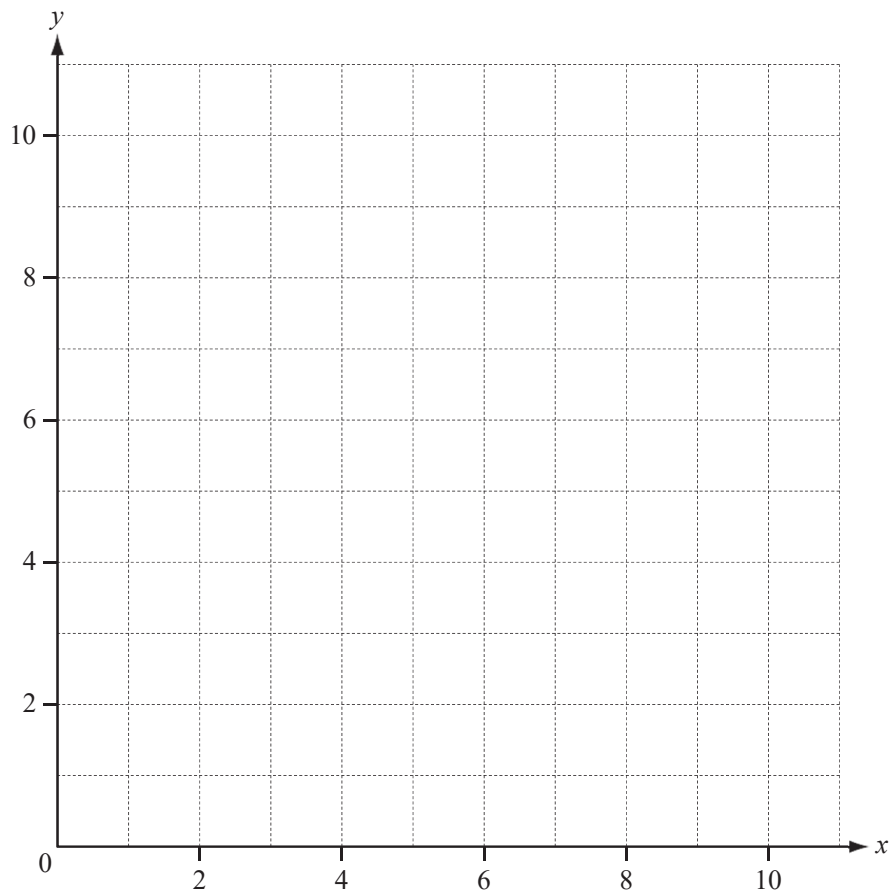(a)   Explain clearly how the following two inequalities satisfy these conditions.

    (i) $x \leqslant 5$ [1]

    (ii) $5x + 3y \geqslant 30$ [2]

Mr Chang also knows that $x + y \leqslant 10.$

    (b) On the grid, show the information above by drawing three straight lines and shading the unwanted regions.

[5]

(c) A large coach costs $450 to hire and a small coach costs $350.

   (i) Find the number of large coaches and the number of small coaches that would give the minimum hire cost for this school trip.

[2]

   (ii) Calculate this minimum cost. [1]

Hassan stores books in large boxes and small boxes.
Each large box holds 20 books and each small box holds 10 books.
He has x large boxes and y small boxes.

(a) Hassan must store at least 200 books.

Show that $2x + y \geq 20$. [1]

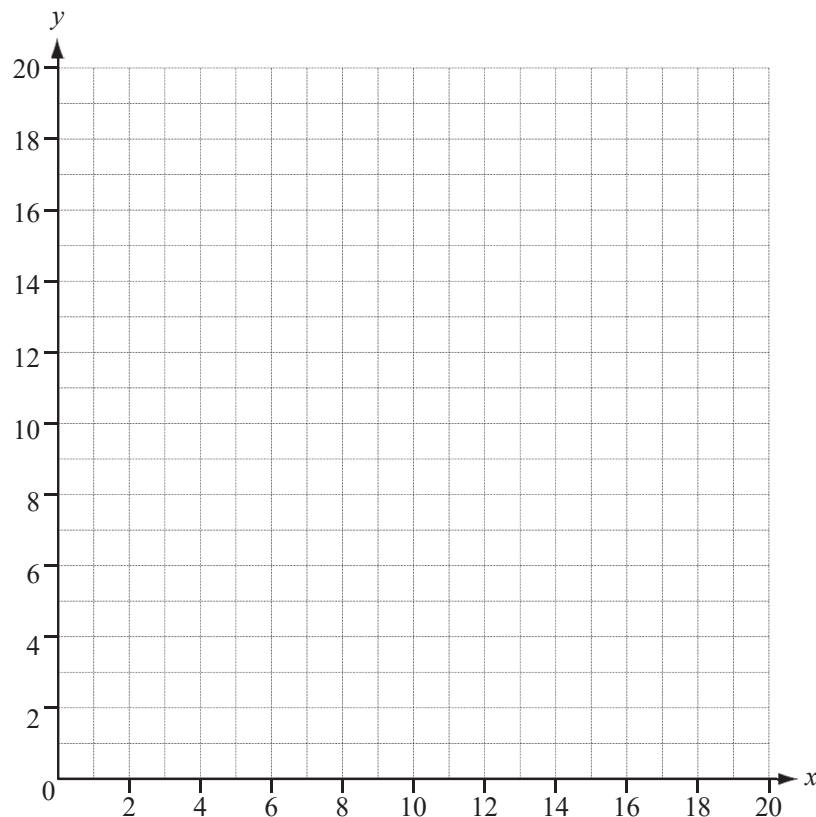(b) Hassan must not use more than 15 boxes.
He must use at least 3 small boxes.
The number of small boxes must be less than or equal to the number of large boxes.

Write down three inequalities to show this information. [3]

(c) On the grid, show the information in part (a) and part (b) by drawing four straight lines and shading the unwanted regions. [6]

6

(d) A large box costs $5 and a small box costs $2.

    (i) Find the least possible total cost of the boxes. [1]

    (ii) Find the number of large boxes and the number of small boxes which give this least   possible cost.

      [2]

A company has a vehicle parking area of 1200 m^2 with space for x cars and y trucks.

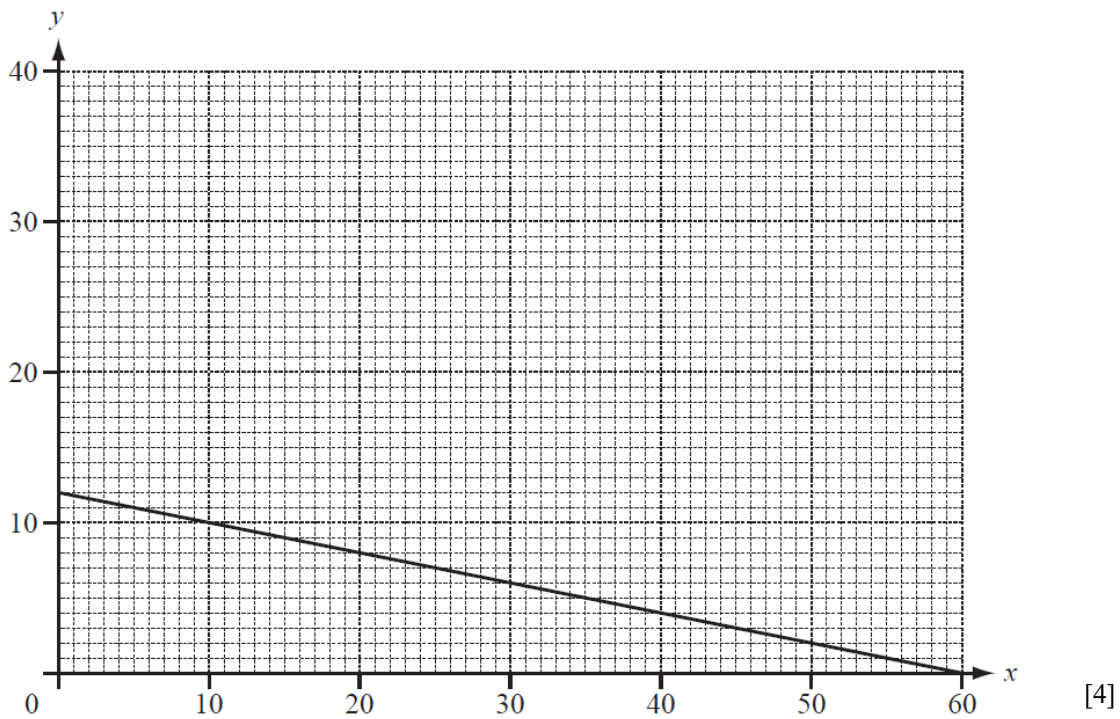Each car requires 20 m^2 of space and each truck requires 100 m^2 of space.

(a) Show that $x + 5y \leqslant 60$. [1]

(b) There must also be space for

[1]

   (i)   at least 40 vehicles,

   (ii) at least 2 trucks.

[1]

   Write down two more inequalities to show this information.

(c) One line has been drawn for you.
On the grid, show the three inequalities by drawing the other two lines and shading the **unwanted** regions.

[4]

(d) Use your graph to find the largest possible number of trucks. [1]

(e) The company charges $5 for parking each car and $10 for parking each truck.
Find the number of cars and the number of trucks which give the company the greatest possible income.

Calculate this income. [3]

Answer the whole of this question on a sheet of graph paper.

Tiago does some work during the school holidays.
In one week he spends x hours cleaning cars and y hours repairing cycles.
The time he spends repairing cycles is at least equal to the time he spends cleaning cars.
This can be written as $y \geqslant x$.

He spends no more than 12 hours working.
He spends at least 4 hours cleaning cars.

(a) Write down two more inequalities in x and/or y to show this information. [3]

(b) Draw x and y axes from 0 to 12, using a scale of 1 cm to represent 1 unit on each axis. [1]

(c) Draw three lines to show the three inequalities. Shade the **unwanted** regions. [5]

(d) Tiago receives $3 each hour for cleaning cars and $1.50 each hour for repairing cycles.

(i) What is the least amount he could receive? [2]

(ii) What is the largest amount he could receive? [2]