GRAPHING INEQUALITIES (REGIONS)

GRADE 6

Examination Practice Questions

You should have:

A ruler, protractor, compasses, a pen, pencil, eraser, calculator.
For some questions, you may need tracing paper.

Instructions

- Use **black** ink or ball-point pen.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**

Information

- The marks for each question are shown in brackets.
- Use the number of marks for each question as a guide as to how much time to spend on each question. As a rough guide, you can multiply the number of marks by 1.2 to see how many minutes you should spend on a question.
- Questions been carefully compiled from or modelled on a variety of past papers and will generally get more challenging as the document progresses. Some of the later questions will go beyond the core grade level for this topic.

Advice

- Read each question carefully before you start to answer it.
- Don’t forget to have fun.
- Check your answers at the end.

Q1. AtoZrevision.com

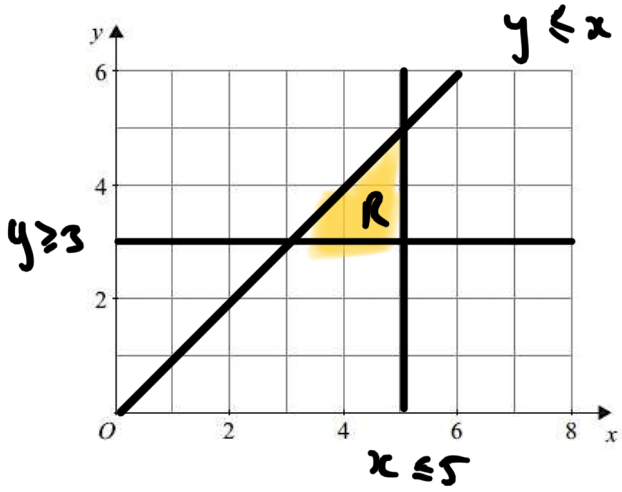
Show, by shading on the grid, the region defined by all three of the inequalities

$x \leq 5$

$y \geq 3$

$y \leq x$

Label your region **R**.



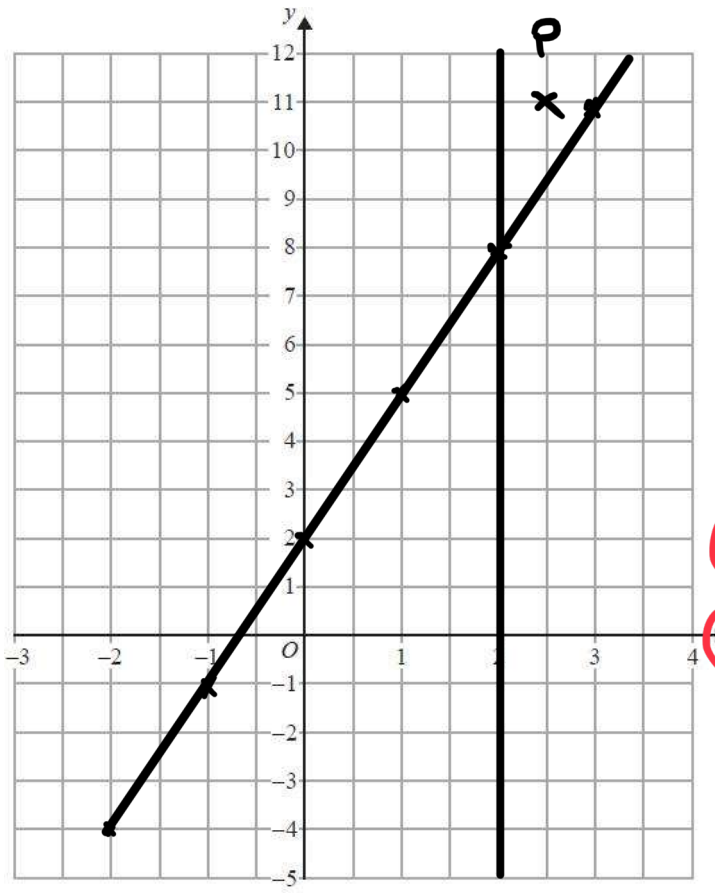
(3 marks)

B1 1 LINE

B1 3 LINES

A1 CORRECT REGION

(a) On the grid, draw the graph of $y = 3x + 2$ for values of x from −2 to 3



B1 FOUR POINTS PLOTTED

B1 ALL POINTS

A01 CORRECT LINE

(3)

(b) Mark with a cross (×) a point on the grid that satisfies both the inequalities

$x > 2$ and $y > 3x + 2$

B1 FOR LINE

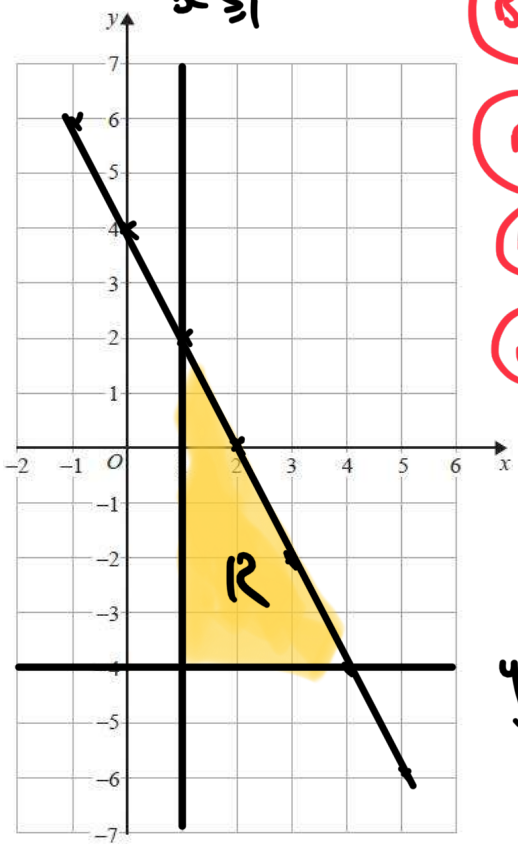
Label this point P.

B1 POINT P

(2)

Q3. AtoZrevision.com

(a) On the grid, draw the graph of $y = -2x + 4$ for values of x from –1 to 5



B1 ONE or TWO POINTS
B1 FOUR POINTS
B1 ALL POINTS
A1 CORRECT LINE

(4)

(b) Show by shading on the grid, the region defined by all three of the inequalities

$y \leq -2x + 4$

$y \geq -4$

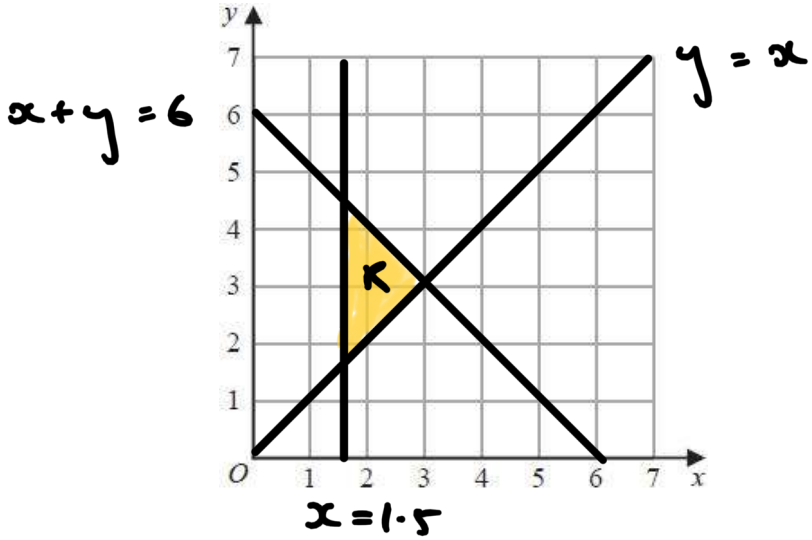
$x \geq 1$

Label your region **R**.

B1 1 LINE
B1 3 LINES
A1 CORRECT REGION

(3)

Q4. AtoZrevision.com



(a) On the grid, draw and **label** the straight line with equation

(i) $x = 1.5$

(ii) $y = x$

(iii) $x + y = 6$

B1 EACH LINE

A1 CORRECT REGION

(3)

(b) Show, by shading on the grid, the region that satisfies **all three** of the inequalities

$x \geq 1.5$ $y \geq x$ $x + y \leq 6$

Label the region **R**.

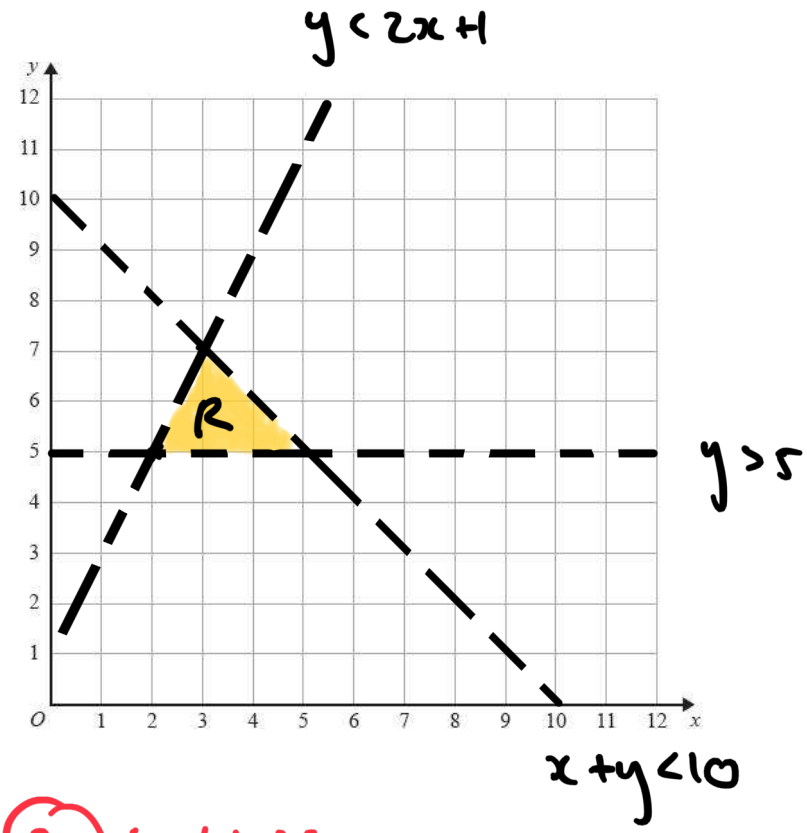
(1)

Q5. AtoZrevision.com

On the grid, show by shading the region defined by the inequalities

$y > 5$ and $y < 2x + 1$ and $x + y < 10$

Label your region **R**.



(3 marks)

B1 1 LINE

B1 3 LINES

A1 CORRECT REGION

(a) Complete the table of values for $2x + y = 4$

$y = -2x + 4$

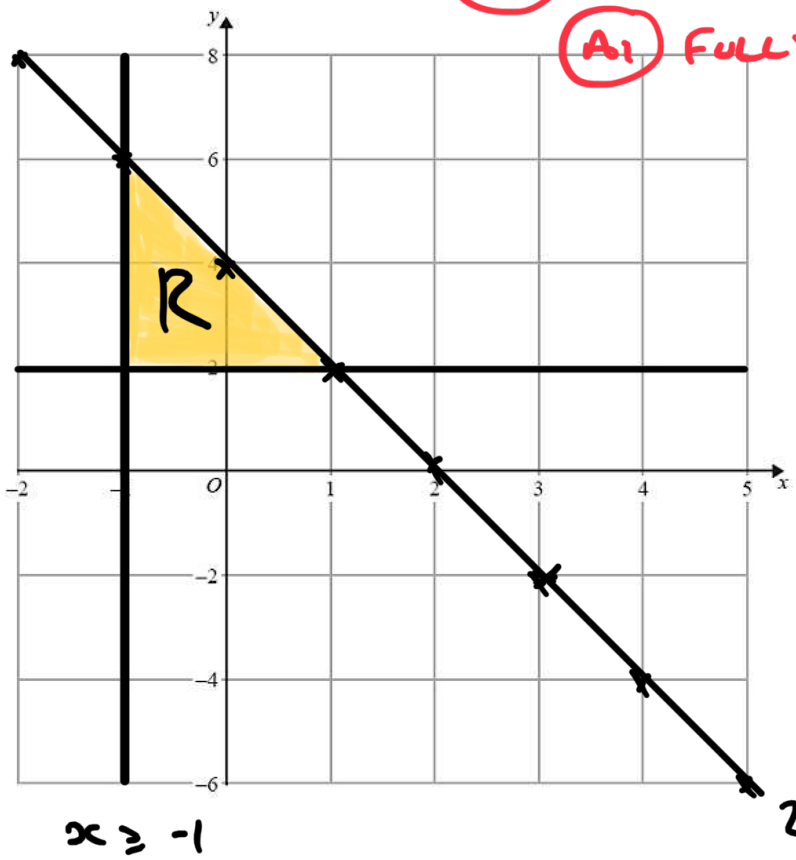
x	−1	2	4
y	6	0	−4

B1 1 VALUE B1 3 VALUES

(2)

(b) On the grid, draw the graph of $2x + y = 4$ for values of x from −1 to 4

(2)



(c) Show, by shading on the grid, the region which satisfies **all three** of the inequalities

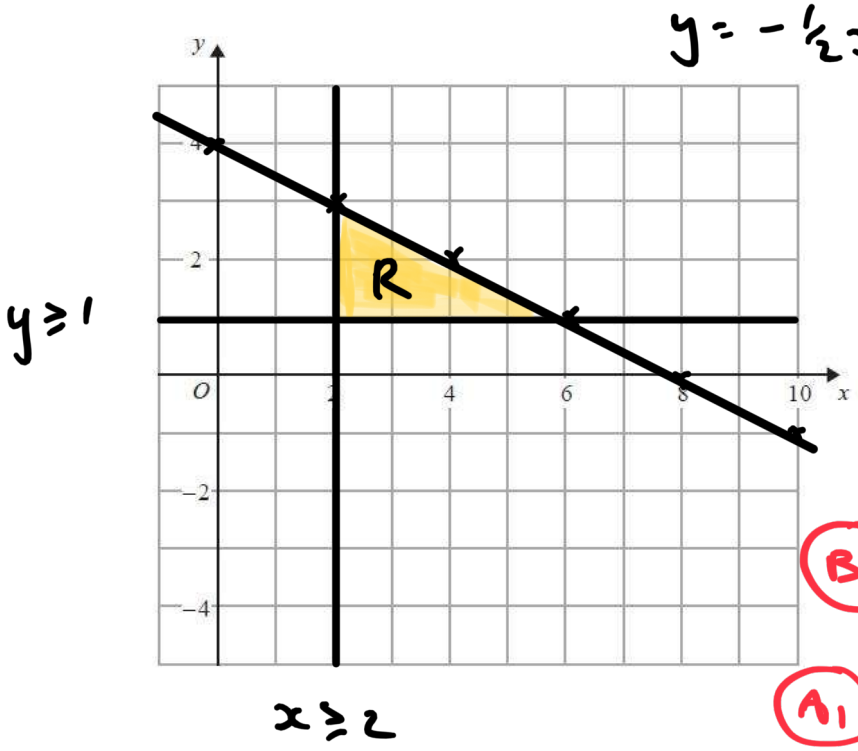
$x \geq -1$, $y \geq 2$ and $2x + y \leq 4$

M1 A1 CORRECT REGION

Label the region **R**.

(2)

(a) On the grid, draw the line with equation $x + 2y = 8$ for values of x from 0 to 9



$y = -\frac{1}{2}x + 4$

$y \geq 1$

$x + 2y = 8$

B1 POINTS PLOTTED

A1 CORRECT LINE

$x \geq 2$

(2)

(b) Show, by shading on the grid, the region defined by all three inequalities

$x + 2y \leq 8$
$x \geq 2$
$y \geq 1$

B1 1 LINE

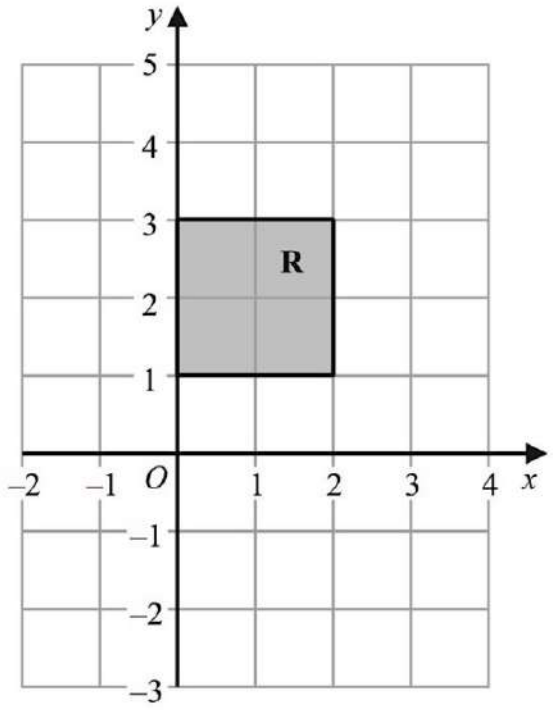
B1 3 LINES CORRECT

A1 CORRECT REGION

Label your region **R**.

(3)

Q8. AtoZrevision.com



B1 TWO CORRECT
B1 FOUR CORRECT

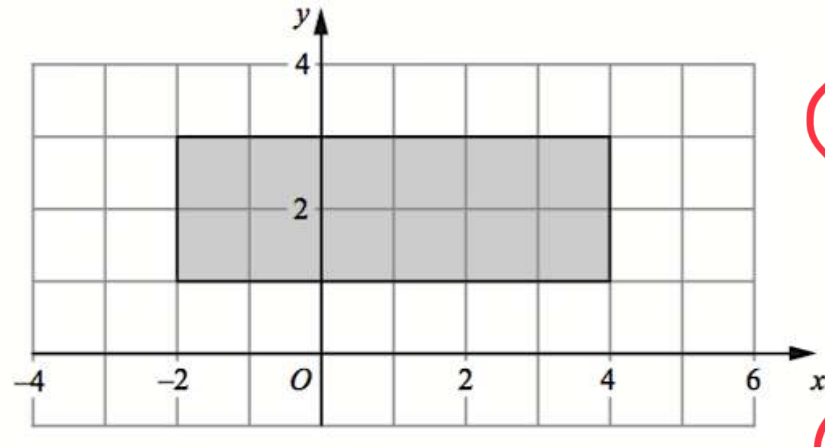
The region **R** shown shaded in the diagram, is bounded by four straight lines.

Write down the inequalities that define **R**.

$x \geq 0$ $x \leq 2$ $y \geq 1$ $y \leq 3$

(2 marks)

Q9. AtoZrevision.com



B1 ONE OR TWO CORRECT
B1 3 CORRECT
B1 4 CORRECT

Write down inequalities to define fully the shaded region.

$x \geq -2$ $x \leq 4$ $y \geq 1$ $y \leq 3$

(3 marks)

Q10. AtoZrevision.com

The region **R**, shown shaded in the diagram, is bounded by three straight lines.

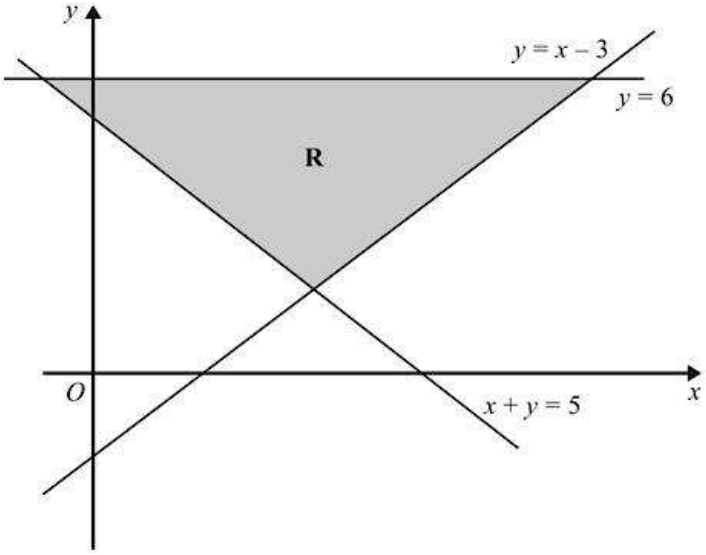


Diagram **NOT** accurately drawn

B1 1 CORRECT
B1 3 CORRECT

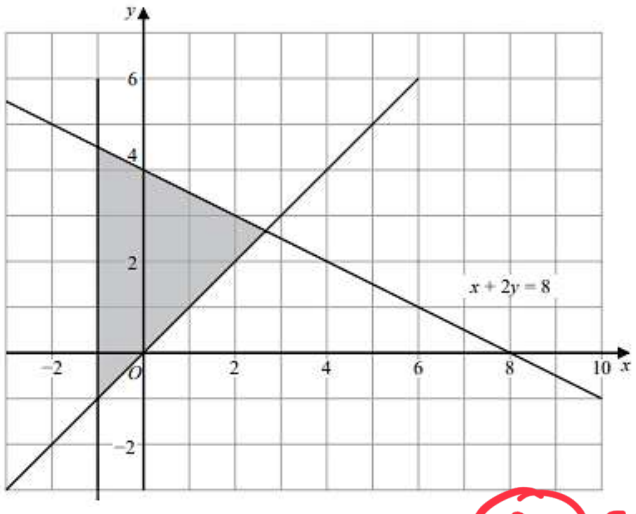
`State the three inequalities that define the region **R**.

$y \leq x - 3$ $y \leq 6$ $x + y \geq 5$

(2 marks)

Q11. AtoZrevision.com

The shaded region in the diagram is bounded by three lines.
The equation of one of the lines is given.



Write down three inequalities that define the shaded region.

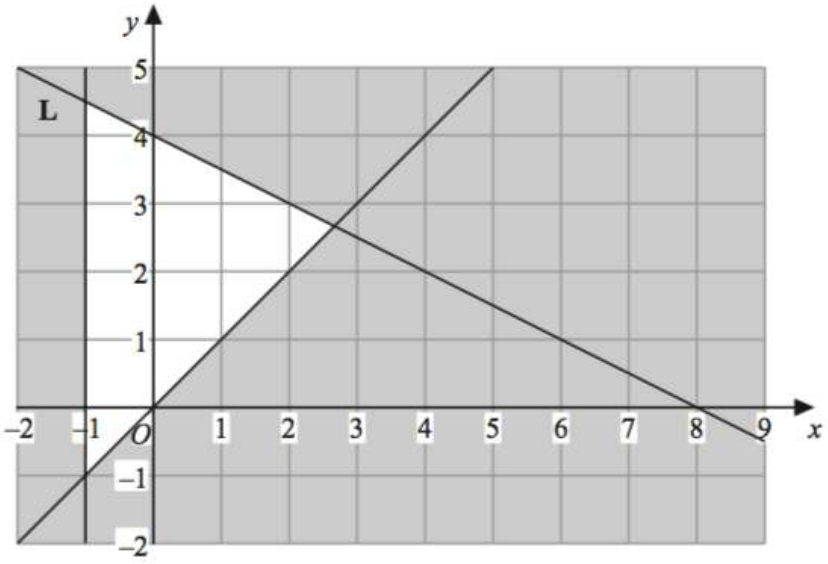
B1 EACH INEQUALITY

$x \geq -1$ $y \geq x$ $x + 2y \leq 8$

(3 marks)

Q12. AtoZrevision.com

Find the three inequalities that define the **unshaded** region shown in the diagram below.

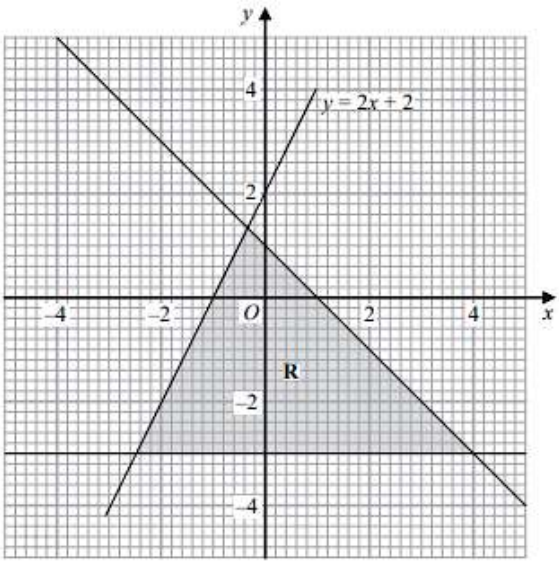


B1 EACH INEQUALITY

$x \geq -1$ $y \geq x$ $y \leq -\frac{1}{2}x + 4$

(3 marks)

Q13. AtoZrevision.com



B1 EACH INEQUALITY

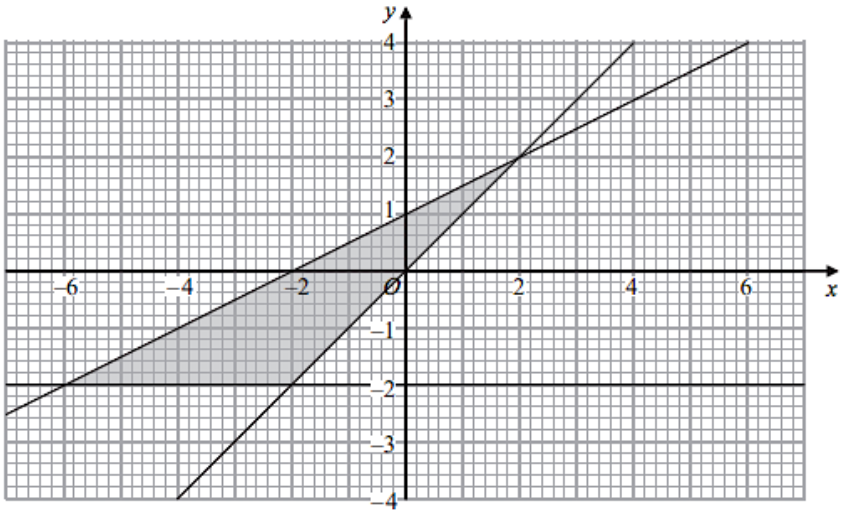
The region R, shown shaded in the diagram, is bounded by three straight lines.

Write down the three inequalities that define R.

$y \geq -3$ $y \leq -x + 1$ $y \leq 2x + 2$

(3 marks)

Q14. AtoZrevision.com



The first inequality that define the shaded region is $y \geq -2$

Write down the two other inequalities that define the shaded region.

$y \leq \frac{1}{2}x + 1$ AND $y \geq x$

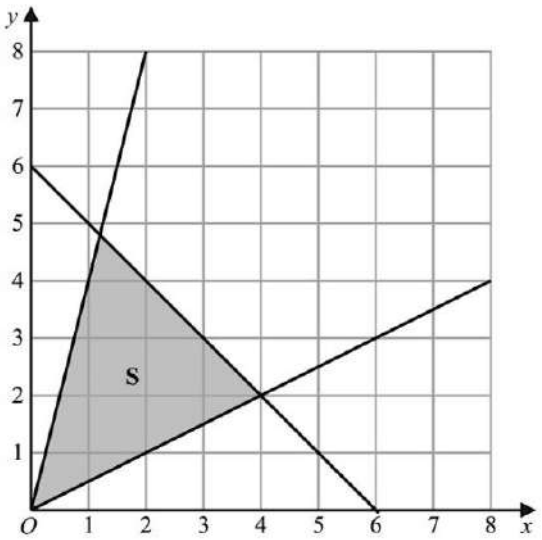
M1 M1 M1

(4 marks)

Q15. AtoZrevision.com

The diagram below shows the region **S** that satisfies the inequalities.

$y \leq 4x$ $y \geq \frac{1}{2}x$ $x + y \leq 6$

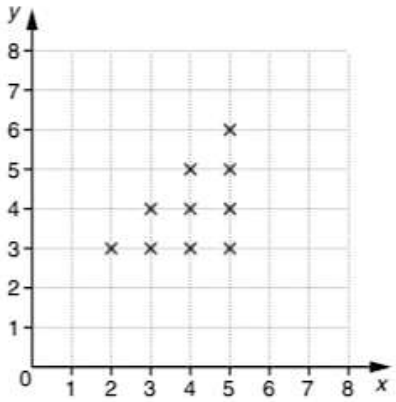


Geoffrey says that the point with coordinates (2, 4) does not satisfy all the inequalities because it does not lie in the shaded region. Is Geoffrey correct? Explain your answer.

NO. (2,4) DOES SATISFY $x + y \leq 6$

(1 mark)

Some points are marked on the grid.



These points are the only points with integer coordinates that satisfy a set of inequalities.
Write down these three inequalities.

$x \leq 5$ B1 $y \geq 3$ B1 $y \leq x + 1$ B1

(3 marks)

QUESTIONS FROM MATHEMATICAL COMPETITIONS

Q1. AtoZrevision.com

A region is defined by the inequalities $x + y > 6$ and $x - y > -4$

Consider the three statements:

1. $x > 1$ ✓ → ONLY THIS ONE!

2. $y > 5$ ✗

3. $(x + y)(x - y) > -24$

Which of the above statements is/are true for **every** point in the region?

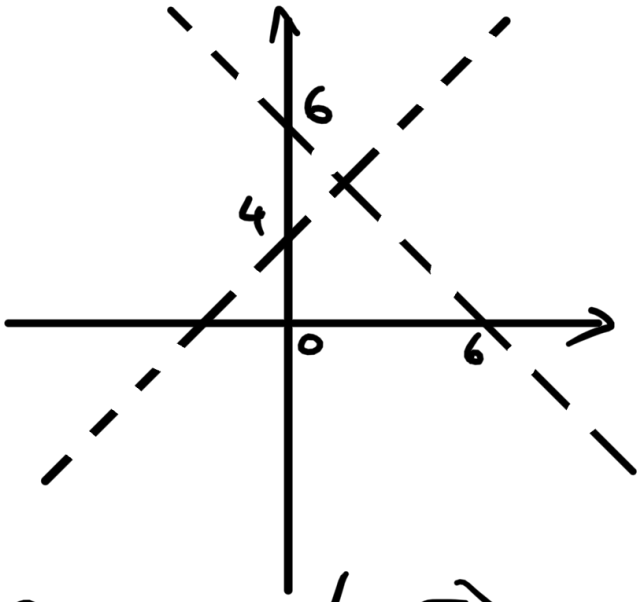
$x+y=6$

$+\ x-y=-4$

$2x = 2$

$x = 1$

$y = 5$



∴ INTERSECTION POINT = (1, 5)

∴ $x > 1$ IS SATISFIED

$y > 5$ IS NOT SATISFIED AS, E.G. (7, 0)

$(x+y)(x-y) > -24$

IF $x = 5, y = 8$ $(5+8)(5-8) = -39$

-39 IS NOT > -24

SO NOT SATISFIED