Inequalities on Graphs Exam Practice
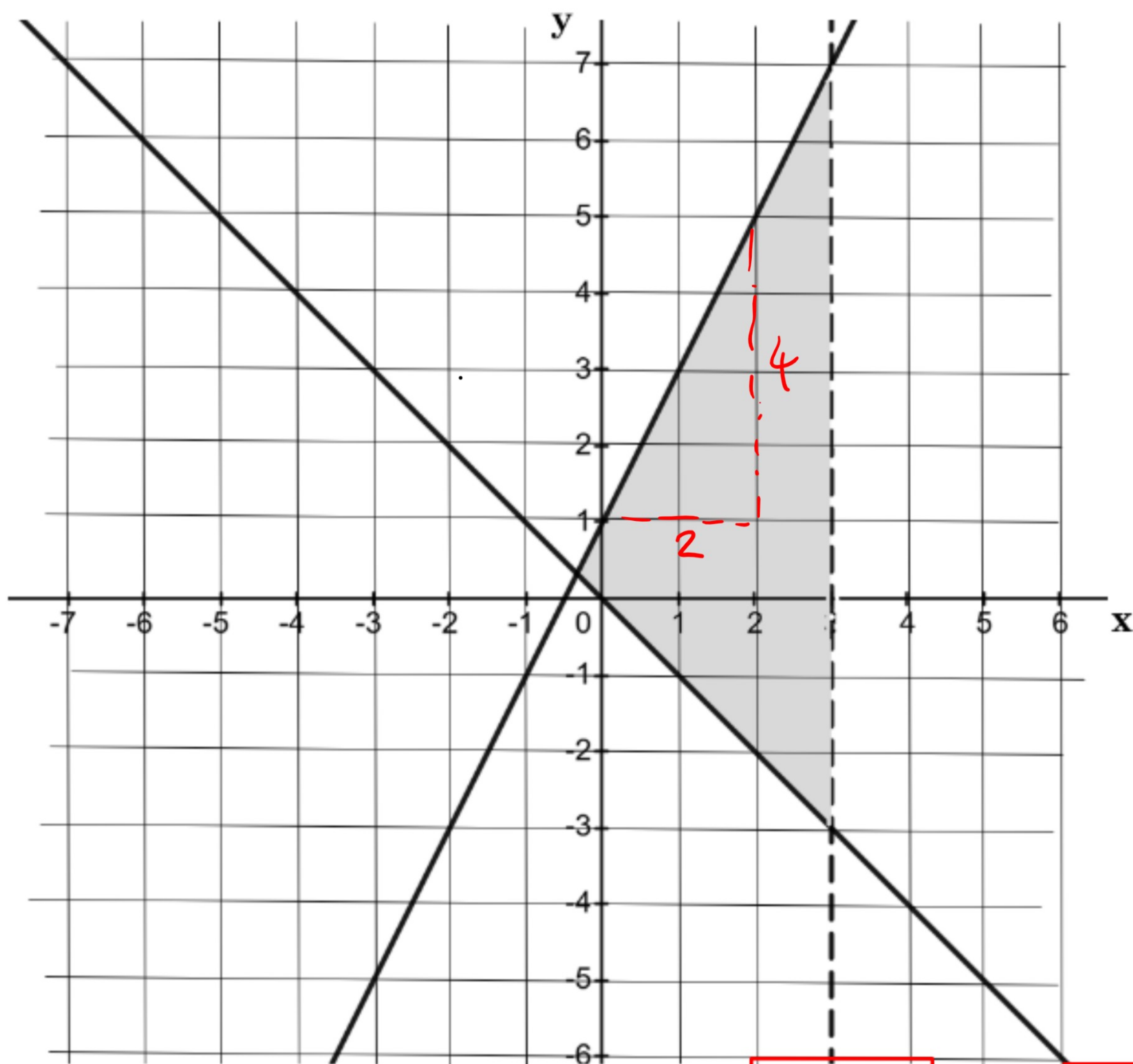
Q1. Write down a set of inequalities which define the shaded region:

gradient = 2
y-intercept = 1
$\Rightarrow$ y = 2x+1

x = 3

y = -x

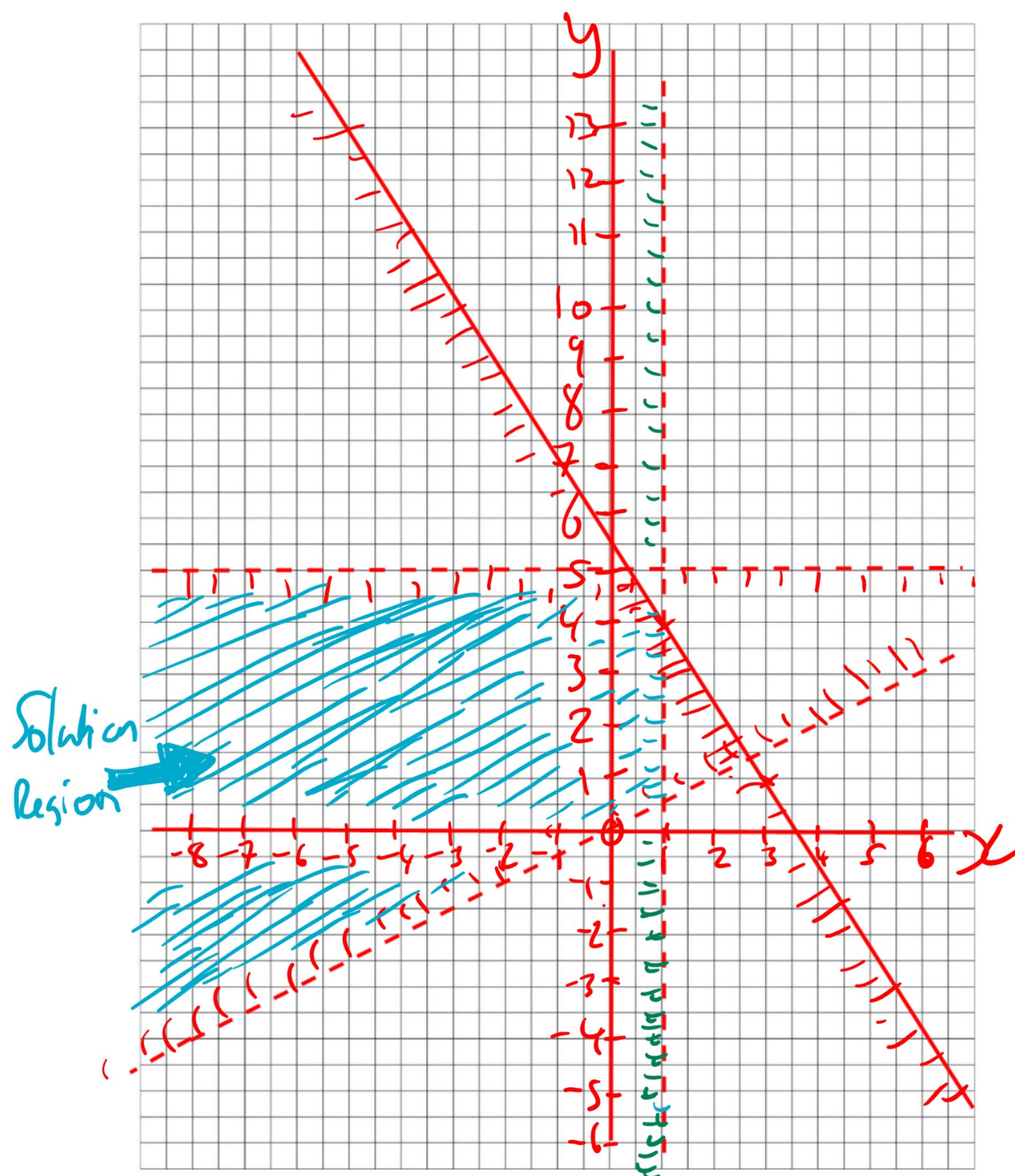x < 3
y ≥ -x
y ≤ 2x+1

Answer: x < 3
y ≥ -x
y ≤ 2x+1

(3 marks)

Q2. On the graph below, shade the region satisfied by the set of inequalities:

$$2y + 3x < 11$$

$$y > \frac{1}{2}x$$

$$y < 5$$

$$x < 1$$

Solution Region

Answer:_____

(4 marks)

Q3. Ron sells apples and bananas in his shop. From his experience he knows that in a day:

-that he will sell at most 100 pieces of fruit in a day

-he will sell at least twice as many apples as bananas

a) Let x and y be the number of apples and bananas he sells respectively. Write the above information in terms of two inequalities.
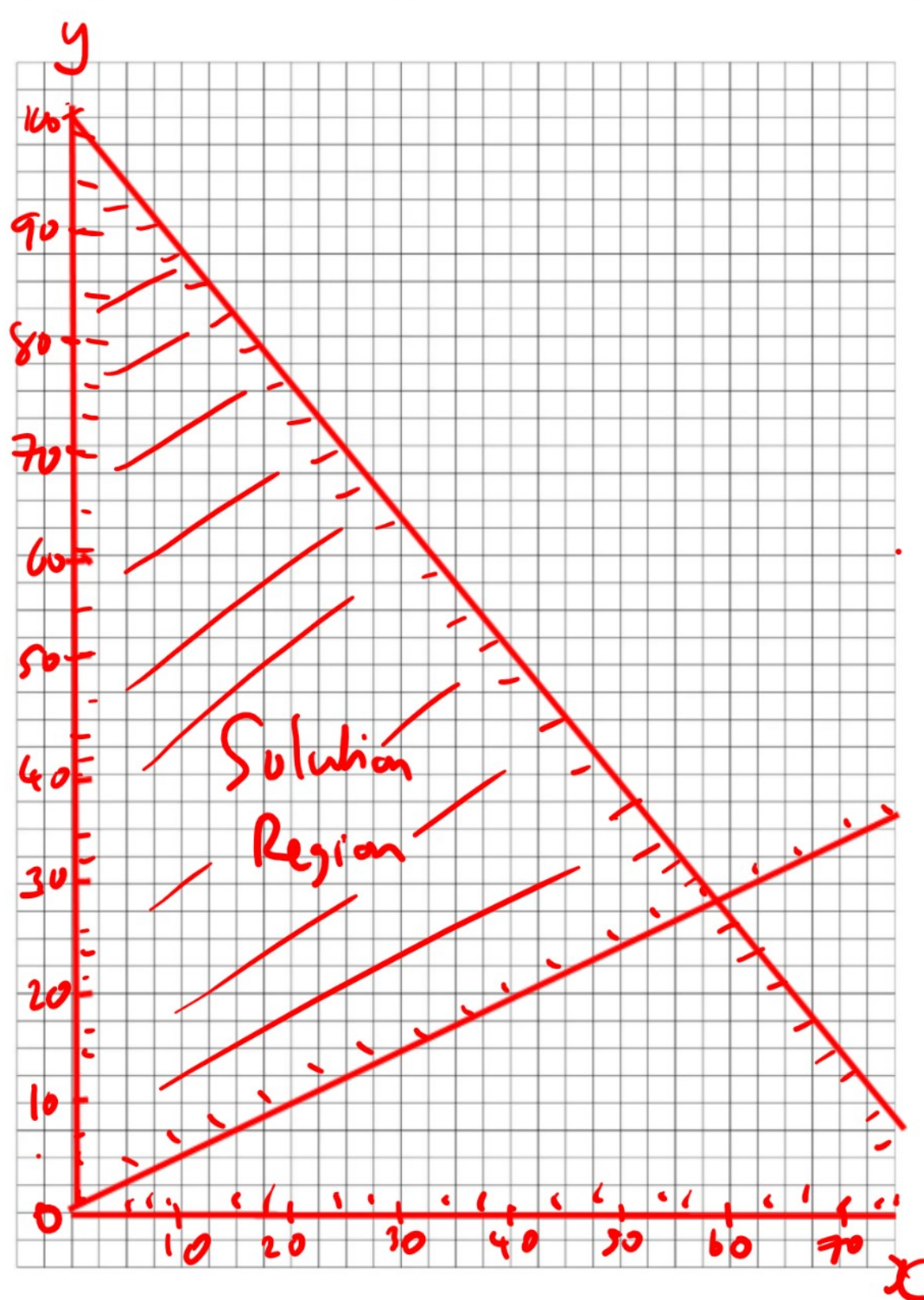
$$x + y \leq 100$$

$$x \geq 2y$$

Answer: $x + y \leq 100$; $x \geq 2y$

(2 marks)

b) Shade the region described by the above inequalities on the graph below together with the inequalities $x \geq 0, y \geq 0$.

Solution Region

c) Find the coordinates of all the vertices of the solution region in (b)

$(0,0)$, $(0,100)$.

· solve $x + y = 100$
        $x = 2y$

$3y = 100 \Rightarrow y = 33\frac{1}{3}$

$x = 66\frac{2}{3}$

∴ $(66\frac{2}{3}, 33\frac{1}{3})$

Answer: $(0,0), (0,100), (66\frac{2}{3}, 33\frac{1}{3})$

(3 marks)

c) Ron's profit on each apple is 20p, and the profit on each banana is 15p. By considering the vertices on the shaded region in part (b), work out the number of each kind of fruit which maximises his profit.

· let p = profit, $\Rightarrow p = 20x + 15y$

· at $(0,100)$ $p = 20(0) + 15(100) \Rightarrow p = 1500$

· at $(66\frac{2}{3}, 33\frac{1}{3})$ $p = 20(66\frac{2}{3}) + 15(33\frac{1}{3}) \Rightarrow p = 1833\frac{1}{3}$ pence

Answer: £18.33

(2 marks)

GCSEMathsRevision.com

Q4. Find least value of a such that the area of the shaded region satisfied by the set of inequalities below has an area at least 34 units².
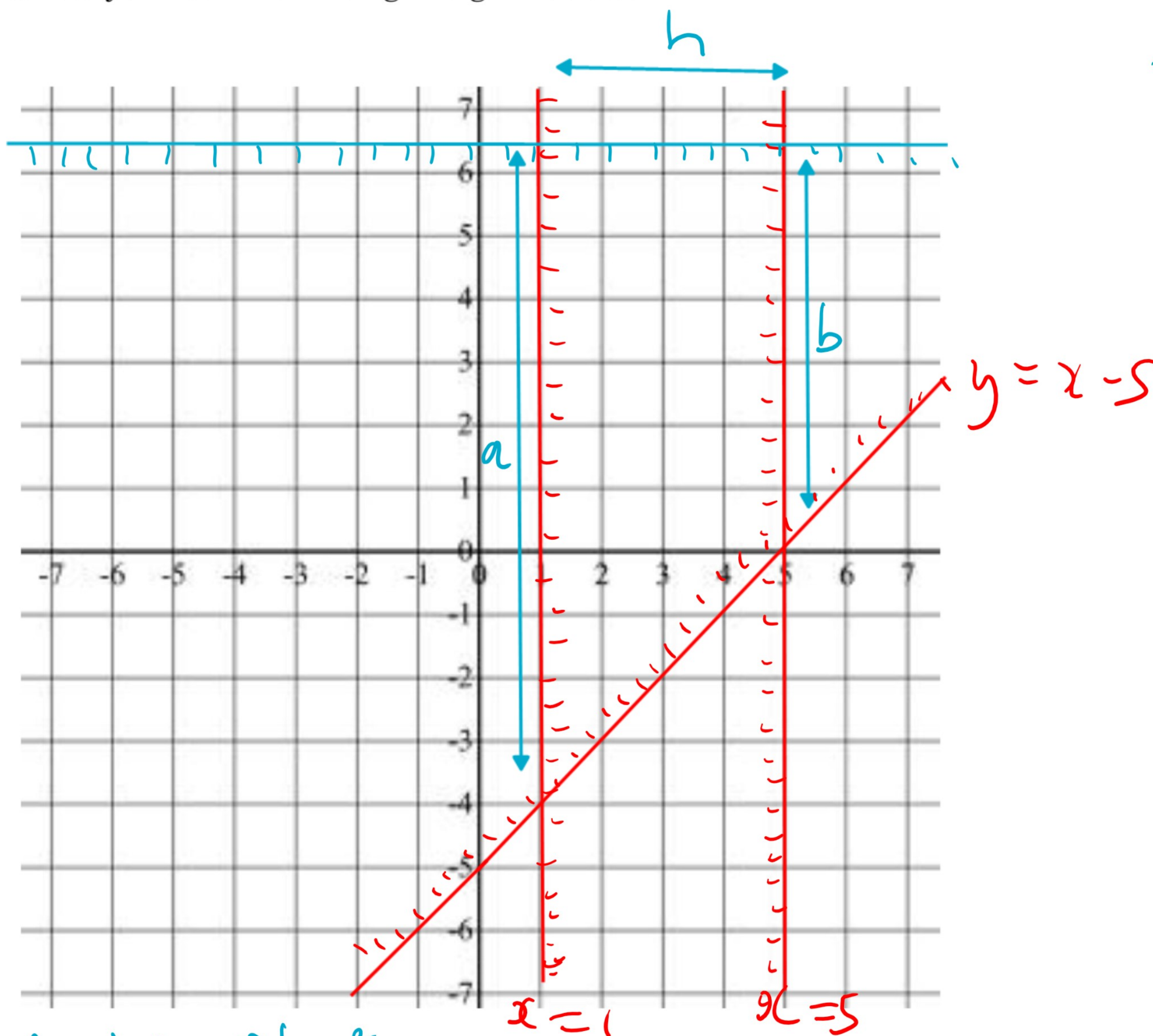
$$y \geq x - 5$$
$$\boxed{y \leq a}$$
$$x \leq 5$$
$$x \geq 1$$

=> is a horizontal line creating a trapezium for the solution region.

Show your solution using the grid below.

$y = x - 5$

$x = 1$ $x = 5$

• need $\frac{1}{2}(a+b)h = 34$

when $h = 4$, $a = b + 4$

• $\frac{1}{2}(b+4+b)4 = 34$

• $2b + 4 = 17$

$b = 6.5$

Answer: _____6.5_____

(5 marks)

GCSEMathsRevision.com