HIGHER

6.7 Inequalities on Graphs: 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A triangle has vertices (1, 2), (3, 2) and (1, 7). Write down three inequalities that together define the triangular region, including its boundary lines.

(Total for Question 1 is 3 marks)

2 x and y are integers that satisfy $x \geq 1$, $y \geq 1$ and $2x + 2y \leq 12$. Find the greatest possible value of $4x + y$.

(Total for Question 2 is 3 marks)

3 A region R is defined by the inequalities $x > 1$, $x + 3y \leq 15$ and $x - y \geq -1$. By substituting, decide whether each of the points A(4, -1), B(-1, -1) and C(4, 6) lies inside R.

(Total for Question 3 is 3 marks)

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4 A region is above the solid line $y = 3x + 2$, below the solid line $y = 3$, and to the right of the solid line $x = 3$. Write down the three inequalities that define the region.

(Total for Question 4 is 3 marks)

5 x and y are integers. How many points with integer coordinates satisfy all of the inequalities $x \geq 2$, $y \geq 0$ and $x + y \leq 10$?

(Total for Question 5 is 3 marks)

6 A region is above the solid line $y = 3x + 1$, below the solid line $y = 8$, and to the right of the dashed line $x = 0$. Write down the three inequalities that define the region.

(Total for Question 6 is 3 marks)

7 A region R is defined by the inequalities $2x + 3y \leq 8$, $3x - y \leq 3$ and $y \leq 5$. By substituting, decide whether each of the points A(4, 0), B(4, 4) and C(5, -1) lies inside R.

(Total for Question 7 is 3 marks)

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8 A region is above the solid line $y = 3x + 3$, below the solid line $y = 4$, and to the right of the dashed line $x = 0$. Write down the three inequalities that define the region.

(Total for Question 8 is 3 marks)

9 A triangle has vertices (0, 1), (5, 1) and (0, 5). Write down three inequalities that together define the triangular region, including its boundary lines.

(Total for Question 9 is 3 marks)

10 x and y are integers that satisfy $x \geq 1$, $y \geq 1$ and $x + 3y \leq 12$. Find the greatest possible value of $2x + 4y$.

(Total for Question 10 is 3 marks)

11 A region R is defined by the inequalities $x > 1$, $y \geq 2$ and $y < 5$. By substituting, decide whether each of the points A(2, 4), B(2, 3) and C(6, 8) lies inside R.

(Total for Question 11 is 3 marks)

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12 A triangle has vertices (0, 3), (2, 3) and (0, 9). Write down three inequalities that together define the triangular region, including its boundary lines.

(Total for Question 12 is 3 marks)

13 A region R is defined by the inequalities $x + 3y < 9$, $x - y \leq 1$ and $x \leq 9$. By substituting, decide whether each of the points A(7, 5), B(1, 8) and C(4, 4) lies inside R.

(Total for Question 13 is 3 marks)

14 A region is above the solid line $y = 3x$, below the dashed line $y = 7$, and to the right of the dashed line $x = 0$. Write down the three inequalities that define the region.

(Total for Question 14 is 3 marks)

15 x and y are integers that satisfy $x \geq 1$, $y \geq 1$ and $3x + y \leq 16$. Find the greatest possible value of $x + y$.

(Total for Question 15 is 3 marks)

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Mark scheme · 6.7 Inequalities on Graphs: 1-hour Pack

Question 1

$x \geq 1$ and $y \geq 2$	**B1**
gradient or equation of the sloping boundary found	**M1**
$5x + 2y \leq 19$ oe	**A1**

Answer: $x \geq 1$, $y \geq 2$, $5x + 2y \leq 19$

Question 2

identifies the region defined by the inequalities	**M1**
tests corner or boundary integer points	**M1**
21 cao	**A1**

Answer: 21

Question 3

substitutes a point into the inequalities	**M1**
checks every inequality for each point	**M1**
A: yes, B: no, C: no cao	**A1**

Answer: A: yes, B: no, C: no

Question 4

$y \geq 3x + 2$ with correct inequality sign	**B1**
$y \leq 3$ with correct sign	**B1**
$x \geq 3$ with correct sign	**B1**

Answer: $y \geq 3x + 2$, $y \leq 3$, $x \geq 3$

Question 5

draws or considers the three boundary lines	**M1**
counts the points row by row (or column by column)	**M1**
45 cao	**A1**

Answer: 45

Question 6

$y \geq 3x + 1$ with correct inequality sign	**B1**
$y \leq 8$ with correct sign	**B1**
$x > 0$ with correct sign	**B1**

Answer: $y \geq 3x + 1$, $y \leq 8$, $x > 0$

Question 7

substitutes a point into the inequalities	**M1**
checks every inequality for each point	**M1**
A: no, B: no, C: no cao	**A1**

Answer: A: no, B: no, C: no

Question 8

$y \geq 3x + 3$ with correct inequality sign	**B1**
$y \leq 4$ with correct sign	**B1**
$x > 0$ with correct sign	**B1**

Answer: $y \geq 3x + 3$, $y \leq 4$, $x > 0$

Question 9

$x \geq 0$ and $y \geq 1$	**B1**
gradient or equation of the sloping boundary found	**M1**
$4x + 5y \leq 25$ oe	**A1**

Answer: $x \geq 0$, $y \geq 1$, $4x + 5y \leq 25$

Question 10

identifies the region defined by the inequalities	**M1**
tests corner or boundary integer points	**M1**
22 cao	**A1**

Answer: 22

Question 11

substitutes a point into the inequalities	**M1**
checks every inequality for each point	**M1**
A: yes, B: yes, C: no cao	**A1**

Answer: A: yes, B: yes, C: no

Question 12

$x \geq 0$ and $y \geq 3$	**B1**
gradient or equation of the sloping boundary found	**M1**
$3x + y \leq 9$ oe	**A1**

Answer: $x \geq 0$, $y \geq 3$, $3x + y \leq 9$

Question 13

substitutes a point into the inequalities	**M1**
checks every inequality for each point	**M1**
A: no, B: no, C: no cao	**A1**

Answer: A: no, B: no, C: no

Question 14

$y \geq 3x$ with correct inequality sign	**B1**
$y < 7$ with correct sign	**B1**
$x > 0$ with correct sign	**B1**

Answer: $y \geq 3x$, $y < 7$, $x > 0$

Question 15

identifies the region defined by the inequalities	**M1**
tests corner or boundary integer points	**M1**
14 cao	**A1**

Answer: 14

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