

# 1.4 Inequalities

## Question Paper

Course	Edexcel IAL Maths: Pure 1
Section	1. Algebra & Functions
Topic	1.4 Inequalities
Difficulty	Easy

**Time allowed:** 60

**Score:** /48

**Percentage:** /100

**Question 1**

Solve the inequalities:

(i)  $2x \geq 8$

(ii)  $3 + 2x < 11$

(iii)  $5 + x > 4x - 1$

**[3 marks]****Question 2**

Solve the inequalities:

(i)  $2x - 9 \geq 5(x - 3)$

(ii)  $3(5 - x) < 2(9 - 2x)$

**[4 marks]****Question 3**(a) Write down the solutions to  $(x - 3)(x - 8) = 0$ .**[2 marks]**

**Question 3**

(b) Sketch the graph of  $y = (x - 3)(x - 8)$ , clearly showing the coordinates of the points where the graph intercepts the  $x$ -axis.

**[2 marks]****Question 3**

(c) Hence, or otherwise, solve the inequality  $(x - 3)(x - 8) < 0$ .

**[2 marks]****Question 4**

(a) Find the discriminant for the quadratic function  $x^2 + 8x + 15$ .

**[2 marks]**

### Question 4

(b) Write down the number of real solutions to the equation  $x^2 + 8x + 15 = 0$ .

**[2 marks]**

### Question 5

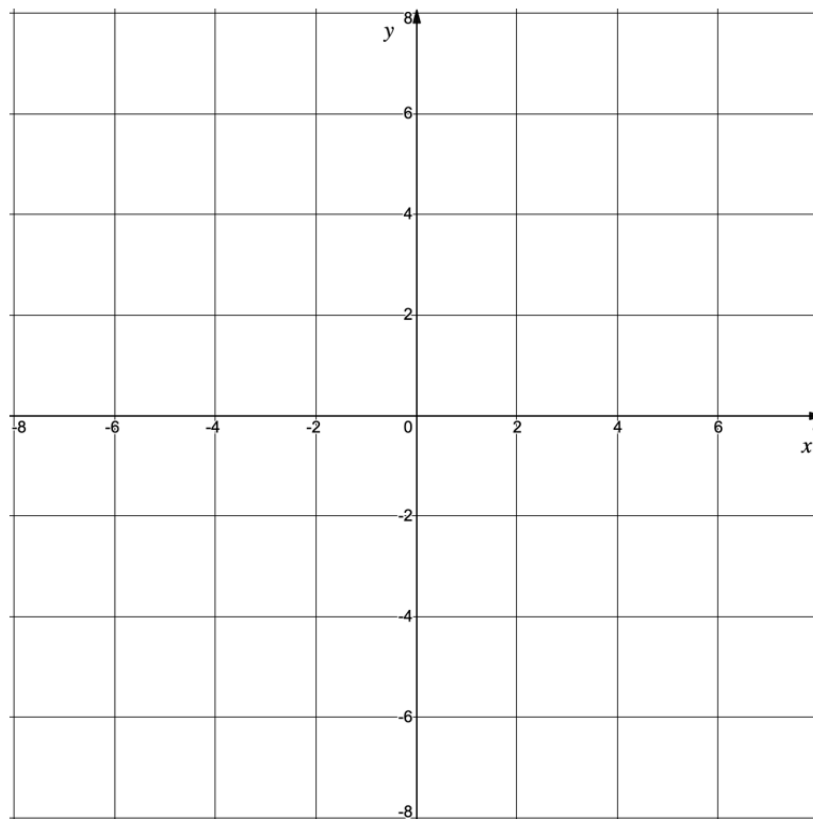
On the axes below, show the region bounded by the inequalities

$$x \geq 0$$

$$y \leq 4$$

$$x \leq 5$$

$$y \geq 1$$



**[4 marks]**

**Question 6**

- (a) (i) Solve the equation  $9 - x^2 = 0$ .  
(ii) Use symmetry to write down the coordinates of the turning point on the graph of  $y = 9 - x^2$ .

**[3 marks]****Question 6**

- (b) Sketch the graph of  $y = 9 - x^2$  and hence solve the inequality  $9 - x^2 \geq 0$ .

**[3 marks]**

### Question 7

(a) Write down, in terms of  $k$ , the discriminant of  $x^2 + 8x + 4k$ .

[1 mark]

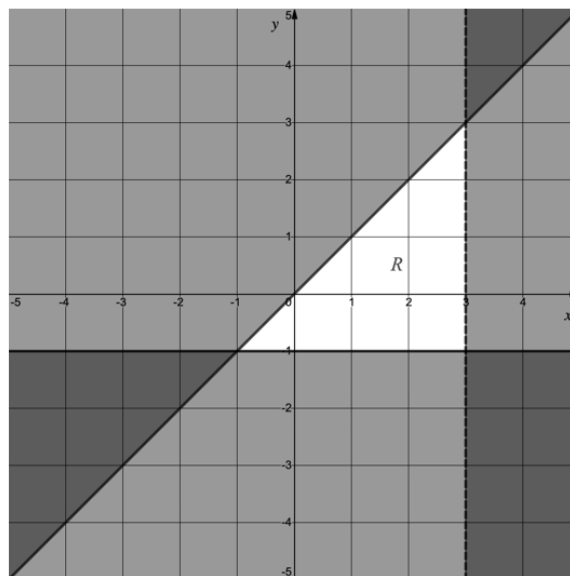
### Question 7

(b) Hence find the values of  $k$  for which the equation  $x^2 + 8x + 4k = 0$  has two real and distinct solutions.

[2 marks]

### Question 8

Write down the three inequalities that define the region  $R$  shown in the diagram below.



[3 marks]

### Question 9

The total cost to a company manufacturing  $c$  cables is  $(500 + 3c)$  pence.

The total income from selling all  $c$  cables is  $(5c - 3500)$  pence.

What is the minimum number of cables the company needs to sell in order to recover their costs?

**[4 marks]**

### Question 10

The equation  $x^2 + kx + 4 = 0$ , where  $k$  is a constant, has no real roots.

Find the possible value(s) of  $k$ .

**[4 marks]**

### Question 11

Solve the inequality  $6x - 7 \leq 35$ , giving your answer in set notation.

**[4 marks]**

### Question 12

Solve the inequality  $6 \leq 8x - 2 \leq 22$ .

**[3 marks]**