

**Quadratic inequalities AS Level**

**6.** Find the set of values of  $x$  for which

(a)  $3(2x + 1) > 5 - 2x$ ,

**(2)**

(b)  $2x^2 - 7x + 3 > 0$ ,

**(4)**

(c) **both**  $3(2x + 1) > 5 - 2x$  **and**  $2x^2 - 7x + 3 > 0$ .

**(2)**

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2. Find the set of values of  $x$  for which

$$x^2 - 7x - 18 > 0.$$

(4)

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4. Find the set of values of  $x$  for which

(a)  $4x - 3 > 7 - x$

(2)

(b)  $2x^2 - 5x - 12 < 0$

(4)

(c) **both**  $4x - 3 > 7 - x$  **and**  $2x^2 - 5x - 12 < 0$

(1)

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3. Find the set of values of  $x$  for which

(a)  $3(x-2) < 8-2x$

**(2)**

(b)  $(2x-7)(1+x) < 0$

**(3)**

(c) both  $3(x-2) < 8-2x$  **and**  $(2x-7)(1+x) < 0$

**(1)**

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3. Find the set of values of  $x$  for which

(a)  $4x - 5 > 15 - x$

(2)

(b)  $x(x - 4) > 12$

(4)

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8. A rectangular room has a width of  $x$  m.

The length of the room is 4 m longer than its width.

Given that the perimeter of the room is greater than 19.2 m,

(a) show that  $x > 2.8$

**(3)**

Given also that the area of the room is less than  $21 \text{ m}^2$ ,

(b) (i) write down an inequality, in terms of  $x$ , for the area of the room.

(ii) Solve this inequality.

**(4)**

(c) Hence find the range of possible values for  $x$ .

**(1)**

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5. Find the set of values of  $x$  for which

(a)  $2(3x + 4) > 1 - x$

(2)

(b)  $3x^2 + 8x - 3 < 0$

(4)



1 Solve the inequality  $\frac{4x-5}{7} > 2x+1$ .

[3]

**2** Solve the inequality  $3x^2 + 10x + 3 > 0$ .

3 Solve the inequality  $5x^2 - 28x - 12 \leq 0$ .

[4]

4 Solve the following inequality.

$$\frac{2x+1}{5} < \frac{3x+4}{6}$$

[4]

5 Solve the inequality  $6(x + 3) > 2x + 5$ .

**[3]**

7 Solve the following inequalities.

(i)  $2(1 - x) > 6x + 5$

[3]

(ii)  $(2x - 1)(x + 4) < 0$

[2]

9 Solve the inequality  $x(x - 6) > 0$ .

[2]

13 Solve the inequality  $x^2 + 2x < 3$ .

[4]



- 15** (i) Write  $x^2 - 5x + 8$  in the form  $(x - a)^2 + b$  and hence show that  $x^2 - 5x + 8 > 0$  for all values of  $x$ . [4]
- (ii) Sketch the graph of  $y = x^2 - 5x + 8$ , showing the coordinates of the turning point. [3]
- (iii) Find the set of values of  $x$  for which  $x^2 - 5x + 8 > 14$ . [3]
- (iv) If  $f(x) = x^2 - 5x + 8$ , does the graph of  $y = f(x) - 10$  cross the  $x$ -axis? Show how you decide. [2]

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8. The width of a rectangular sports pitch is  $x$  metres,  $x > 0$ . The length of the pitch is 20 m more than its width. Given that the perimeter of the pitch must be less than 300 m,

(a) form a linear inequality in  $x$ .

(2)

Given that the area of the pitch must be greater than  $4800 \text{ m}^2$ ,

(b) form a quadratic inequality in  $x$ .

(2)

(c) by solving your inequalities, find the set of possible values of  $x$ .

(4)

**(Total 8 marks)**

1 Solve the inequality  $x^2 - 6x - 40 \geq 0$ .

2 Solve the inequality  $4x - 3x^2 > 0$ .

3 Solve the inequality

$$x^2 + x - 6 \geq 0.$$