2.4 Quadratic Inequalities: 30-minute Pack

AQA 8365 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Solve the inequality $x^2 - 6x + 8 \leq 0$.

(Total for Question 1 is 3 marks)

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2 Solve the inequality $x^2 - 16 > 0$.

(Total for Question 2 is 1 mark)

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3 Solve the inequality $x^2 - 7x + 10 \leq 0$.

(Total for Question 3 is 1 mark)

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4 Solve the inequality $3x^2 - 5x - 2 \geq 0$.

(Total for Question 4 is 1 mark)

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5 Find the values of x that satisfy both $x^2 + x - 20 < 0$ and $x < -1$.

(Total for Question 5 is 4 marks)

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6 n is an integer. Write down all the values of n for which $n^2 + 11n + 24 \leq 0$.

(Total for Question 6 is 3 marks)

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7 A rectangular lawn has length $(x + 3)$ metres and width $(x - 1)$ metres, where $x > 1$. The area of the lawn is greater than 45 m². Form and solve an inequality to find the range of possible values of x.

(Total for Question 7 is 5 marks)

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8 Find the set of values of x that satisfy both $x^2 - 16 < 0$ and $x - 2 > 0$.

(Total for Question 8 is 2 marks)

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9 Solve the inequality $x^4 - 5x^2 + 4 < 0$.

(Total for Question 9 is 6 marks)

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Mark scheme · 2.4 Quadratic Inequalities: 30-minute Pack

Question 1

factorise to (x-2)(x-4)	**M1**
correct critical values x = 2 and x = 4	**A1**
correct inequality $2 \leq x \leq 4$ (oe)	**A1**

Answer: $2 \leq x \leq 4$

Question 2

$x < -4$ or $x > 4$ (oe) cao	**B1**

Answer: $x < -4$ or $x > 4$

Question 3

$2 \leq x \leq 5$ (oe) cao	**B1**

Answer: $2 \leq x \leq 5$

Question 4

$x \leq -1/3$ or $x \geq 2$ (oe) cao	**B1**

Answer: $x \leq -1/3$ or $x \geq 2$

Question 5

solves the quadratic inequality	**M1**
$-5 < x < 4$	**A1**
combines with the linear inequality (number line)	**M1**
$-5 < x < -1$ cao	**A1**

Answer: $-5 < x < -1$

Question 6

finds the critical values	**M1**
$-8 \leq n \leq -3$ seen	**A1**
integers -8, -7, -6, -5, -4, -3 listed cao	**A1**

Answer: -8, -7, -6, -5, -4, -3

Question 7

form area expression (x+3)(x-1)	**M1**
form inequality $x^2+2x-3>45$ or equivalent $x^2+2x-48>0$	**M1**
factorise to (x+8)(x-6)	**M1**
correct critical values x = -8 and x = 6	**A1**
correct final answer $x > 6$, rejecting $x < -8$ as it contradicts $x > 1$ (cao)	**A1**

Answer: $x > 6$

Question 8

solve $x^2-16<0$ to obtain $-4<x<4$, and $x-2>0$ to obtain $x>2$	**M1**
correct combined interval $2 < x < 4$ (ft)	**A1**

Answer: $2 < x < 4$

Question 9

substitute $u=x^2$ to obtain $u^2-5u+4<0$	**M1**
factorise to $(u-1)(u-4)<0$	**M1**
correct critical values u = 1 and u = 4, giving $1 < u < 4$	**A1**
convert to $1 < x^2 < 4$, splitting into $x^2>1$ and $x^2<4$	**M1**
correct critical x values -2, -1, 1, 2	**A1**
fully correct final answer $-2 < x < -1$ or $1 < x < 2$ (oe)	**A1**

Answer: $-2 < x < -1$ or $1 < x < 2$

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