HIGHER

8.6 Quadratic Inequalities: 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 This question has two parts.

(a) Solve the inequality $x^2 - 6x + 5 < 0$. **(2)**

(b) Express the solution from part (a) in set notation. **(2)**

(Total for Question 1 is 4 marks)

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2 Solve the inequality $2x^2 - 8x \geq 0$. Give your answer in inequality form.

(Total for Question 2 is 2 marks)

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3 Solve the inequality $-x^2 + 4x < 0$. Give your answer in inequality form.

(Total for Question 3 is 2 marks)

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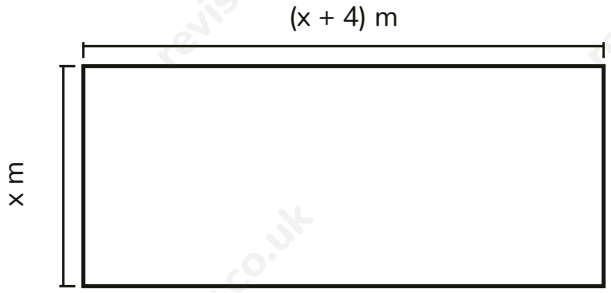
4 Solve the inequality $(x-1)(x+2) \geq 0$. Give your answer both in inequality form and in set notation.

(Total for Question 4 is 3 marks)

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5 A rectangular lawn has length $(x + 4)$ metres and width x metres, where $x > 0$. The area of the lawn must be greater than 45 m^2. Form an inequality in x and solve it to find the possible values of x.

Diagram NOT accurately drawn



(Total for Question 5 is 5 marks)

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6 Write down all the integer values of x that satisfy $x^2 - 10x + 21 < 0$

(Total for Question 6 is 3 marks)

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7 Find the set of values of x for which $x^2 - x - 12 \leq 0$ and $x^2 - 9 > 0$.

(Total for Question 7 is 5 marks)

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Mark scheme · 8.6 Quadratic Inequalities: 30-minute Pack

Question 1

(a) factorise to (x-1)(x-5) or identify roots 1 and 5	**M1**
(a) $1 < x < 5$ cao	**A1**

(a) Answer: $1 < x < 5$

(b) convert interval to set notation	**M1**
(b) (1, 5) cao	**A1**

(b) Answer: (1, 5)

Question 2

factorise to 2x(x-4) and identify roots x=0 and x=4	**M1**
$x \leq 0$ or $x \geq 4$ cao	**A1**

Answer: $x \leq 0$ or $x \geq 4$

Question 3

rearrange or factorise, e.g. $-x(x-4) < 0$ or multiply by -1 giving $x^2 - 4x > 0$	**M1**
$x < 0$ or $x > 4$ cao	**A1**

Answer: $x < 0$ or $x > 4$

Question 4

identify roots $x = 1$ and $x = -2$ and sign on intervals	**M1**
state inequality form $x \leq -2$ or $x \geq 1$	**M1**
set notation: (-infty, -2] U [1, +infty) cao	**A1**

Answer: Inequality form: $x \leq -2$ or $x \geq 1$. Set notation: (-infty, -2] U [1, +infty)

Question 5

forms the inequality $x(x+4) > 45$ oe	**M1**
rearranges and attempts to factorise $x^2 + 4x - 45$	**M1**
$(x+9)(x-5)$ or critical values $x = -9$, $x = 5$	**A1**
$x < -9$ or $x > 5$	**A1**
applies the constraint $x > 0$ to give the final answer $x > 5$ (ft)	**B1**

Answer: $x > 5$

Question 6

finds critical values	**M1**
correct range identified	**M1**
4, 5, 6	**A1**

Answer: 4, 5, 6

Question 7

factorises (x-4)(x+3) or finds critical values -3, 4 for the first inequality	**M1**
$-3 \leq x \leq 4$	**A1**
factorises (x-3)(x+3) or finds critical values -3, 3 for the second inequality	**M1**
$x < -3$ or $x > 3$	**A1**
correctly combines both solution sets to give $3 < x \leq 4$	**A1**

Answer: $3 < x \leq 4$

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