5.7 Expanding and Factorising Quadratics: 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Expand the brackets and simplify: $(x + 2)(x + 3)$.

(Total for Question 1 is 1 mark)

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2 Expand and simplify each expression.

(a) $(x + 3)(x + 8)$ **(2)**

(b) $(x + 5)(x + 5)$ **(2)**

(Total for Question 2 is 4 marks)

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3 Factorise each expression.

(a) Factorise $x^2 + 7x + 12$ **(2)**

(b) Factorise $x^2 + 3x - 18$ **(2)**

(Total for Question 3 is 4 marks)

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4 Factorise the quadratic $x^2 + 7x + 10$.

(Total for Question 4 is 3 marks)

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5 A toy company sells $k^2 + 5k + 6$ toys at a fair. They pack the toys into groups so the number of toys is $(k + 2)(k + 3)$.
Explain briefly why the two expressions are equal.

(Total for Question 5 is 3 marks)

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6 Solve $x^2 + 2x - 24 = 0$

(Total for Question 6 is 3 marks)

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7 A rectangular flower bed has length $(x + 3)$ metres and width $(2x + 1)$ metres.

(a) Expand and simplify $(x + 3)(2x + 1)$. **(2)**

(b) Factorise $2x^2 + 7x + 3$ to write it as a product of two linear brackets. **(4)**

(Total for Question 7 is 6 marks)

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Mark scheme · 5.7 Expanding and Factorising Quadratics: 30-minute Pack

Question 1

$x^2 + 5x + 6$ cao **B1**

Answer: $x^2 + 5x + 6$.

Question 2

(a) attempts expansion, e.g. $x^2 + 8x + 3x + 24$ **M1**

(a) $x^2 + 11x + 24$ cao **A1**

(a) Answer: $x^2 + 11x + 24$

(b) attempts expansion, e.g. $x^2 + 5x + 5x + 25$ **M1**

(b) $x^2 + 10x + 25$ cao **A1**

(b) Answer: $x^2 + 10x + 25$

Question 3

(a) attempts a factor pair of 12 that sums to 7, e.g. 3 and 4 **M1**

(a) $(x + 3)(x + 4)$ cao **A1**

(a) Answer: $(x + 3)(x + 4)$

(b) attempts a factor pair of -18 that sums to 3, e.g. 6 and -3 **M1**

(b) $(x + 6)(x - 3)$ cao **A1**

(b) Answer: $(x + 6)(x - 3)$

Question 4

identify two numbers that multiply to 10 and add to 7 (2 and 5) or show splitting the middle term **M1**

$(x + 2)(x + 5)$ cao **A1**

correct checking statement e.g. expand to get $x^2 + 7x + 10$ oe **B1**

Answer: $(x + 2)(x + 5)$.

Question 5

expand $(k + 2)(k + 3)$ to show method, e.g. $k^2 + 2k + 3k + 6$ **M1**

correctly simplify to $k^2 + 5k + 6$ **A1**

conclude that this matches the given expression $k^2 + 5k + 6$, so the two expressions are equal oe **B1**

Answer: Expanding gives $(k + 2)(k + 3) = k^2 + 2k + 3k + 6 = k^2 + 5k + 6$, which matches the given expression $k^2 + 5k + 6$ exactly, so the two expressions are equal for all k.

Question 6

factorises to $(x + 6)(x - 4) = 0$ (or uses a correct alternative method) **M1**

$x = -6$ **A1**

$x = 4$ cao **A1**

Answer: $x = -6$ or $x = 4$

Question 7

(a) multiply out brackets correctly, e.g. use distributive law **M1**

(a) $2x^2 + 7x + 3$ cao **A1**

(a) Answer: $2x^2 + 7x + 3$

(b) identify pair of numbers or use splitting the middle term: find factors of 2*3 = 6 that add to 7 (1 and 6) **M1**

(b) split middle term and factor by grouping or show rearrangement to $(2x^2 + x) + (6x + 3)$ **M1**

(b) $(x + 3)(2x + 1)$ cao **A1**

(b) correct check by expanding to $2x^2 + 7x + 3$ oe **B1**

(b) Answer: $(x + 3)(2x + 1)$

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