4.8 Expanding and Factorising: 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Factorise each expression fully.

(a) 6x + 9 **(1)**

(b) 10x - 15 **(1)**

(Total for Question 1 is 2 marks)

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2 Expand -5(3x - 2)

(Total for Question 2 is 1 mark)

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3 Factorise the quadratic: $x^2 + 5x + 6$.

(Total for Question 3 is 4 marks)

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4 Factorise the quadratic: $x^2 + 7x + 12$. Give the answer in bracket form.

(Total for Question 4 is 4 marks)

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5 Expand and simplify $(2a + 3)(3a - 5)$

(Total for Question 5 is 2 marks)

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6 Factorise fully $14x^2 - 63x$

(Total for Question 6 is 2 marks)

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7 Factorise $t^2 - 100$

(Total for Question 7 is 2 marks)

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8 Expand and simplify $3(2y - 3) + 3(3y - 6)$

(Total for Question 8 is 3 marks)

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9 Simplify fully $(x^2 - 9)/(x + 3)$

(Total for Question 9 is 2 marks)

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10 Solve $x^2 - 5x - 14 = 0$ by factorising. Show your working.

(Total for Question 10 is 3 marks)

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11 Remove common factors and factorise fully: $12p^2q - 8pq^2 + 4pq$.

(a) Write down the highest common factor that can be removed from all three terms. **(2)**

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(b) Factorise the expression fully after removing the common factor. **(6)**

(Total for Question 11 is 8 marks)

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12 Show that $(x + 4)(2x - 1) = 2x^2 + 7x - 4$. You must show your steps.

(Total for Question 12 is 3 marks)

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13 Factorise fully $16x^2 - 81$

(Total for Question 13 is 2 marks)

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14 Priya has designed a rectangular photo frame. The area of the front face of the frame is $(x^2 + 5x - 24)$ cm^2, where x is in centimetres and $x > 3$.

Diagram NOT accurately drawn



(a) Factorise $x^2 + 5x - 24$ to write expressions, in terms of x, for the length and the width of the frame, given that the length is greater than the width. **(2)**

(b) Given that $x = 7$, work out the perimeter of the frame. **(3)**

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(Total for Question 14 is 5 marks)

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15 Show that $(2x + 3)(x - 4) - (2x - 1)(x + 5)$ simplifies to a linear expression. Factorise your answer fully.

(Total for Question 15 is 4 marks)

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Mark scheme · 4.8 Expanding and Factorising: 1-hour Pack

Question 1

(a) 3(2x + 3) cao **B1**

(a) Answer: 3(2x + 3)

(b) 5(2x - 3) cao **B1**

(b) Answer: 5(2x - 3)

Question 2

-15x + 10 oe cao **B1**

Answer: -15x + 10

Question 3

find two numbers multiplying to 6 and adding to 5 (2 and 3) shown **M1**

split middle term or show factors used: $x^2 + 2x + 3x + 6$ **M1**

(x + 2)(x + 3) cao **A1**

final answer given in bracket form (x + 2)(x + 3) oe **B1**

Answer: (x + 2)(x + 3)

Question 4

identify pair 3 and 4 that multiply to 12 and add to 7 **M1**

split middle term or show factors: $x^2 + 3x + 4x + 12$ **M1**

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

final answer presented in bracket form (x + 3)(x + 4) oe **B1**

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

Question 5

at least 3 terms of the expansion correct **M1**

$6a^2 - a - 15$ **A1**

Answer: $6a^2 - a - 15$

Question 6

a correct partial factorisation or one common factor **M1**

7x(2x - 9) **A1**

Answer: 7x(2x - 9)

Question 7

recognises a difference of two squares **M1**

(t + 10)(t - 10) **A1**

Answer: (t + 10)(t - 10)

Question 8

expands one bracket correctly **M1**

expands the second bracket correctly **M1**

15y - 27 **A1**

Answer: 15y - 27

Question 9

factorises the numerator, (x - 3)(x + 3) **M1**

x - 3 oe cao, (x + 3) cancelled correctly **A1**

Answer: x - 3

Question 10

finds two numbers with sum -5 and product -14, namely -7 and 2 **M1**

(x - 7)(x + 2) [= 0] cao **A1**

x = 7 and x = -2 both cao **A1**

Answer: x = 7 or x = -2

Question 11

(a) identify common factor 4pq or equivalent shown **M1**

(a) 4pq cao **A1**

(a) Answer: 4pq

(b) factor out 4pq from each term and show intermediate division: $12p^2q \div 4pq = 3p$, $-8pq^2 \div 4pq = -2q$, $4pq \div 4pq = 1$ **M1**

(b) write the expression as 4pq(3p - 2q + 1) or equivalent bracket contents shown **M1**

(b) show multiplication back check for at least one term, e.g. $4pq * 3p = 12p^2q$ **M1**

(b) 4pq(3p - 2q + 1) cao **A1**

(b) correct ordering of terms in the brackets (3p - 2q + 1) oe **B1**

(b) final answer presented in fully factorised form 4pq(3p - 2q + 1) oe **B1**

(b) Answer: 4pq(3p - 2q + 1)

Question 12

expand brackets correctly: x*2x, x*(-1), 4*2x, 4*(-1) shown **C1**

combine the four terms to form $2x^2 + 7x - 4$ **C1**

final statement equal to $2x^2 + 7x - 4$ with clear workings (cso) **C1**

Answer: $2x^2 + 7x - 4$

Question 13

recognises difference of two squares, $\sqrt{16x^2} = 4x$ and $\sqrt{81} = 9$ oe **M1**

(4x - 9)(4x + 9) cao **A1**

Answer: (4x - 9)(4x + 9)

Question 14

(a) two numbers with sum 5 and product -24 identified (8 and -3) oe **M1**

(a) length = (x + 8) cm and width = (x - 3) cm oe **A1**

(a) Answer: length = (x + 8) cm, width = (x - 3) cm

(b) substitutes x = 7 into both expressions to find length = 15 cm and width = 4 cm oe **M1**

(b) uses perimeter = 2(length + width) oe **M1**

(b) 38 cm cao **A1**

(b) Answer: 38 cm

Question 15

expands (2x + 3)(x - 4) correctly to $2x^2 - 5x - 12$ oe **M1**

expands (2x - 1)(x + 5) correctly to $2x^2 + 9x - 5$ oe **M1**

subtracts correctly, taking care with signs, to reach -14x - 7, cso **dM1**

-7(2x + 1) cao, fully factorised **A1**

Answer: -7(2x + 1)

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