



5.7F Expanding and Factorising Quadratics: Foundation Tier Practice

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Expand the single bracket $3(x + 4)$.

(Total for Question 1 is 1 mark)

- 2** Expand and simplify $2(2x - 5)$.

(Total for Question 2 is 1 mark)

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

(Total for Question 3 is 1 mark)

- 4** Expand and simplify $(x + 5)(x - 1)$.

(Total for Question 4 is 2 marks)

- 5** Factorise fully: $2x^2 + 6x$.

(Total for Question 5 is 2 marks)

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

(Total for Question 6 is 3 marks)

7 Factorise $x^2 - 4x - 12$.

(Total for Question 7 is 3 marks)

8 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 8 is 3 marks)

9 Expand and simplify $3(x - 2)(x + 1)$. Show all steps.

(Total for Question 9 is 4 marks)

10 Factorise fully $4x^2 + 2x - 12$.

(Total for Question 10 is 4 marks)

11 The area of a rectangle is given by $x^2 + 6x + 8$ square cm. The length is $(x + 2)$ cm. Find the width in terms of x . Show your working. Then find the width when $x = 3$.

(a) Factorise the expression for the area $x^2 + 6x + 8$. (2)

(b) Use part (a) to find the width of the rectangle in terms of x . (2)

(c) Find the width when $x = 3$. (2)

(Total for Question 11 is 6 marks)

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

(a) Expand and simplify the expression for the area.

(b) Given the area is $2x^2 + 7x + 3$, show how this can be written as a product of two linear brackets.

(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 12 is 6 marks)

Mark scheme · 5.7F Expanding and Factorising Quadratics: Foundation Tier Practice

Question 1

- **B1** $3x + 12$ cao
- **Answer:** $3x + 12$ (or $12 + 3x$).

Question 2

- **B1** $4x - 10$ cao
- **Answer:** $4x - 10$.

Question 3

- **B1** $x^2 + 5x + 6$ cao
- **Answer:** $x^2 + 5x + 6$.

Question 4

- **M1** multiply terms correctly, e.g. $x \cdot x$, $x \cdot (-1)$, $5 \cdot x$, $5 \cdot (-1)$ or show full FOIL
- **A1** $x^2 + 4x - 5$ cao
- **Answer:** $x^2 + 4x - 5$.

Question 5

- **M1** factor out common factor $2x$
- **A1** $2x(x + 3)$ cao
- **Answer:** $2x(x + 3)$.

Question 6

- **M1** identify two numbers that multiply to 10 and add to 7 (2 and 5) or show splitting the middle term
- **A1** $(x + 2)(x + 5)$ cao
- **B1** correct checking statement e.g. expand to get $x^2 + 7x + 10$ oe
- **Answer:** $(x + 2)(x + 5)$.

Question 7

- **M1** identify two numbers that multiply to -12 and add to -4 (-6 and 2) or show splitting the middle term
- **A1** $(x - 6)(x + 2)$ cao
- **B1** correct check, e.g. expand to $x^2 - 4x - 12$ oe
- **Answer:** $(x - 6)(x + 2)$.

Question 8

- **M1** expand $(k + 2)(k + 3)$ to show method, e.g. $k^2 + 2k + 3k + 6$
- **A1** correctly simplify to $k^2 + 5k + 6$
- **B1** conclude that this matches the given expression $k^2 + 5k + 6$, so the two expressions are equal oe
- **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 9

- **M1** expand $(x - 2)(x + 1)$ to $x^2 - x - 2$ or show partial expansion
- **M1** multiply by 3 correctly to get $3x^2 - 3x - 6$
- **A1** $3x^2 - 3x - 6$ cao
- **B1** clear and correct working shown or check via substitution
- **Answer:** $3x^2 - 3x - 6$.

Question 10

- **M1** factor out common factor 2 first to give $2(2x^2 + x - 6)$
- **M1** factorise the quadratic inside correctly or show splitting the middle term
- **A1** $2(2x - 3)(x + 2)$ cao or equivalent correct factorisation
- **B1** correct check by expansion or statement
- **Answer:** $2(2x - 3)(x + 2)$.

Question 11

- (a) **M1** identify two numbers that multiply to 8 and add to 6 (2 and 4) or show splitting the middle term
- (a) **A1** $(x + 2)(x + 4)$ cao
- **(a) Answer:** $(x + 2)(x + 4)$.
- (b) **M1** divide the area expression by length $(x + 2)$ or cancel a factor to show method
- (b) **A1** width = $x + 4$ cao
- **(b) Answer:** $x + 4$
- (c) **M1** substitute $x = 3$ into width expression or show calculation $3 + 4$
- (c) **A1** 7 cm cao
- **(c) Answer:** 7 cm

Question 12

- (a) **M1** multiply out brackets correctly, e.g. use distributive law
- (a) **A1** $2x^2 + 7x + 3$ cao
- **(a) Answer:** $2x^2 + 7x + 3$
- (b) **M1** identify pair of numbers or use splitting the middle term: find factors of $2 \times 3 = 6$ that add to 7 (1 and 6)
- (b) **M1** split middle term and factor by grouping or show rearrangement to $(2x^2 + x) + (6x + 3)$
- (b) **A1** $(x + 3)(2x + 1)$ cao
- (b) **B1** correct check by expanding to $2x^2 + 7x + 3$ oe
- **(b) Answer:** $(x + 3)(2x + 1)$