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GCSE MATHS

Algebra

Edexcel 1MA1 | Subtopic collection Topic 12

Expanding brackets

Higher tier

Past paper question booklet

80	2003-2025	Higher
question groups	available papers	tier

Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

11. (a) Expand and simplify

$$(x+y)^2$$

.....

(2)

(b) Hence or otherwise find the value of

$$3.47^2 + 2 \times 3.47 \times 1.53 + 1.53^2$$

.....

(2)

Page Total

4. (a) Simplify

(i) $p^2 \times p^7$

.....

(ii) $x^8 \div x^3$

.....

(iii) $\dfrac{y^4 \times y^3}{y^5}$

.....

(3)

(b) Expand $t(3t^2 + 4)$

.....

(2)

17. (a) Evaluate

(i) 3^{-2}

.....

(ii) $36^{\frac{1}{2}}$

.....

(iii) $27^{\frac{2}{3}}$

.....

(iv) $\left(\frac{16}{81}\right)^{-\frac{3}{4}}$

.....

(5)

(b) (i) Rationalise the denominator of $\frac{21}{\sqrt{7}}$ and simplify your answer.

.....

(ii) Expand $\left(\sqrt{5}+2\sqrt{3}\right)\left(\sqrt{5}-2\sqrt{3}\right)$
Express your answer as simply as possible.

.....

(4)

4. (a) Expand and simplify

$$3(2x - 1) - 2(2x - 3)$$

.....

(2)

(b) Factorise

$$y^2 + y$$

.....

(1)

7. (a) Simplify $k^5 \div k^2$

.....
(1)

(b) Expand and simplify

(i) $4(x+5)+3(x-7)$

.....

(ii) $(x+3y)(x+2y)$

.....
(4)

(c) Factorise $(p+q)^2+5(p+q)$

.....
(1)

(d) Simplify $(m^{-4})^{-2}$

.....
(1)

(e) Simplify $2t^2 \times 3r^3t^4$

.....
(2)

Do not write here

Blank

20. (a) Expand and simplify $(2x + 5)(3x – 2)$

.....

(3)

(b) Given that $x^2 + 6x – 5 = (x + p)^2 + q$ for all values of x,

find the value of

(i) p,

(ii) q.

p = ...

q = ...

(3)

Q20

(Total 6 marks)

19. Expand and simplify $(\sqrt{3}-\sqrt{2})(\sqrt{3}+\sqrt{2})$

Q19

.....

(Total 2 marks)

21. (a) Expand $x(3 - 2x^2)$

.....

(2)

(b) Factorise completely $12xy + 4x^2$

.....

(2)

(c) Simplify $\dfrac{20a^2}{4ab^2}$

.....

(2)

(d) Simplify $\dfrac{x-3}{x^2-9}$

.....

(2)

Q21

(Total 8 marks)

24. (i) Expand and simplify

$$n^2 + (n + 1)^2$$

.....

n is a whole number.

(ii) Prove that $n^2 + (n + 1)^2$ is always an odd number.

Blank

Q24

(Total 4 marks)

Blank

9. (a) Factorise completely $3a^2 - 6a$

.....

(2)

(b) Make q the subject of the formula $P = 2q + 10$

$q =$ .....

(2)

(c) Expand and simplify $(y + 3)(y - 4)$

.....

(2)

(d) Factorise $4p^2 - 9q^2$

.....

(2)

Q9

(Total 8 marks)

Blank

14. (a) Simplify $a \times a \times a$

.....
(1)

(b) Expand $5(3x - 2)$

.....
(1)

(c) Expand $3y(y + 4)$

.....
(2)

(d) Expand and simplify $2(x - 4) + 3(x + 2)$

.....
(2)

(e) Expand and simplify $(x + 4)(x - 3)$

.....
(2)

Q14

(Total 8 marks)

10. (a) Simplify $3a + 4c - a + 3c$

.....

(2)

(b) Expand $y(2y - 3)$

.....

(1)

(c) Factorise $x^2 - 4x$

.....

(2)

(d) Expand and simplify $2(x + 3) + 3(2x - 1)$

.....

(2)

(e) Solve $3(x + 2) = 8$

$x =$ .....

(2)

Q10

(Total 9 marks)

19. (a) Expand and simplify $(x - 3)(x + 5)$

.....

(2)

(b) Solve $\frac{29-x}{4} = x+5$

$x =$ .....

(3) **Q19**

(Total 5 marks)

Blank

17. (a) Factorise $3x + 12$

.....

(1)

(b) Solve $4(2x - 3) = 5x + 7$

$x =$ .....

(3)

(c) Expand and simplify $(y + 4)(y + 5)$

.....

(2)

(d) Factorise fully $8x^2 + 12xy$

.....

(2)

Q17

(Total 8 marks)

Blank

16. (a) Expand and simplify $3(x + 5) + 2(5x - 6)$

.....

(2)

(b) Simplify $\frac{2x+4}{2}$

.....

(1)

(c) Factorise $5x + 10$

.....

(1)

(d) Factorise fully $x^2y + xy^2$

.....

(2)

Q16

(Total 6 marks)

Blank

23. (a) Expand and simplify $(x - 3)(x + 5)$

.....

(2)

(b) Solve $x^2 + 8x - 9 = 0$

.....

(3)

Q23

(Total 5 marks)

25. (a) Expand and simplify $(2x + 4y)(4x - 5y)$

.....

(2)

(b) Simplify fully $\dfrac{(x+10)^5}{(x+10)^4}$

.....

(1)

(c) Simplify fully $\dfrac{x^2-25}{x^2+7x+10}$

.....

(3)

For all values of x, $x^2 + 6x - 2 = (x + p)^2 + q$

(d) Find the value of p and the value of q.

$p =$ ..... $q =$ .....

(2)

Q25

(Total 8 marks)

2 (a) Simplify $4b \times 2c$

.....

(1)

(b) Expand $3(2w - 5t)$

.....

(2)

(c) Expand and simplify $(x + 7)(x - 2)$

.....

(2)

(Total for Question 2 is 5 marks)

11 (a) Expand $3(x + 2)$

.....

(2)

(b) Factorise completely $12\ x^3y - 18\ xy^2$

.....

(2)

(c) Expand and simplify $(2x - 3)(x + 4)$

.....

(2)

(d) Simplify $5x^4y^3 \times 2x^3y^2$

.....

(2)

(Total for Question 11 is 8 marks)

15. (a) Expand $x(x + 2)$

.....

(2)

(b) Expand and simplify $(x + 3)(x – 4)$

.....

(2)

(c) Factorise completely $2y^2 – 4y$

.....

(2)

(d) Factorise $x^2 – 9$

.....

(1)

(Total 7 marks)

Q15

blank

18. (a) Simplify $(c^2 k^5)^4$

.....

(1)

(b) Expand and simplify $(3x + 5)(4x - 1)$

.....

(2)

(c) Solve $x^2 - 3x - 10 = 0$

$x =$ .....

(3)

Q18

(Total 6 marks)

2 (a) Simplify $3y + 2x - 4 + 5x + 7$

.....

(1)

(b) Factorise $2x^2 - 4x$

.....

(2)

(c) Expand and simplify $11 - 3(x+2)$

.....

(2)

(d) Expand and simplify $(x-6)(3x+7)$

.....

(2)

(Total for Question 2 is 7 marks)

7. (a) Solve $3(2t - 4) = 2t + 12$

$t =$ .....

(3)

(b) Expand and simplify $2(x - y) - 3(x - 2y)$

.....

(2)

(c) Expand and simplify $(x - 5)(x + 7)$

.....

(2)

Q7

(Total 7 marks)

2 (a) Simplify $5f \times 4g$

.....

(1)

(b) Expand and simplify $9a + 3(8 - 2a)$

.....

(2)

(c) Simplify $c^2 \times c^6$

.....

(1)

(d) Simplify $(x^5)^3$

.....

(1)

(e) Factorise $7y + 21$

.....

(1)

(Total for Question 2 is 6 marks)

5 (a) Simplify $2e - 8f + 6e + 3f$

.....

(2)

(b) Factorise $4t + 10$

.....

(1)

(c) Expand and simplify $3 + 2(p - 1)$

.....

(2)

(d) Factorise $ax + bx + ay + by$

.....

(2)

(Total for Question 5 is 7 marks)

8 (a) Expand $3(2y - 5)$

.....
(1)

(b) Factorise completely $8x^2 + 4xy$

.....
(2)

(c) Make h the subject of the formula

$$t = \frac{gh}{10}$$

$h =$ .....
(2)

(Total for Question 8 is 5 marks)

14 (a) Expand and simplify $(p + 9)(p - 4)$

.....

(2)

(b) Solve $\frac{5w - 8}{3} = 4w + 2$

$w =$ .....

(3)

(c) Factorise $x^2 - 49$

.....

(1)

(d) Simplify $(9x^8y^3)^{\frac{1}{2}}$

.....

(2)

(Total for Question 14 is 8 marks)

6 (a) Factorise $10a + 5$

.....

(1)

(b) Expand and simplify $5(x + 7) + 3(x - 2)$

.....

(2)

(c) Factorise completely $3a^2b + 6ab^2$

.....

(2)

(Total for Question 6 is 5 marks)

Question 29

12 (a) Expand and simplify $(x + 5)(x - 8)$

.....

(2)

(b) Factorise $x^2 - 16$

.....

(1)

(Total for Question 12 is 3 marks)

11 (a) Expand $4(3x + 5)$

.....

(1)

(b) Expand and simplify $2(x - 4) + 3(x + 5)$

.....

(2)

(c) Expand and simplify $(x + 4)(x + 6)$

.....

(2)

(Total for Question 11 is 5 marks)

26 (a) Rationalise the denominator of $\frac{5}{\sqrt{2}}$

.....

(2)

(b) Expand and simplify $(2 + \sqrt{3})^2 - (2 - \sqrt{3})^2$

.....

(2)

(Total for Question 26 is 4 marks)

14 (a) Factorise $x^2 + 5x + 4$

.....

(2)

(b) Expand and simplify $(3x - 1)(2x + 5)$

.....

(2)

(c) Write as a single fraction $\frac{1}{2x} + \frac{1}{5x} - \frac{1}{3x}$

.....

(2)

(Total for Question 14 is 6 marks)

11 (a) Expand and simplify $3(x + 4) + 2(5x - 1)$

.....

(2)

(b) Expand and simplify $(2x + 1)(x - 4)$

.....

(2)

(c) Factorise completely $6y^2 - 9xy$

.....

(2)

(Total for Question 11 is 6 marks)

9 (a) Factorise $3t + 12$

.....

(1)

(b) (i) Expand and simplify $7(2x + 1) + 6(x + 3)$

.....

(ii) Show that when x is a whole number

$$7(2x + 1) + 6(x + 3)$$

is always a multiple of 5

(3)

(Total for Question 9 is 4 marks)

4 (a) Expand $3(2 + t)$

.....

(1)

(b) Expand $3x(2x + 5)$

.....

(2)

(c) Expand and simplify $(m + 3)(m + 10)$

.....

(2)

(Total for Question 4 is 5 marks)

2 (a) Simplify $2a + 4b + 3a - b$

.....

(2)

(b) Expand $5(m + 2)$

.....

(1)

(c) Simplify $a^5 \times a^4$

.....

(1)

(Total for Question 2 is 4 marks)

Question 37

12 Simplify fully $(x + 5)^2 - (x - 5)^2$

.....

(Total for Question 12 is 2 marks)

4 (a) Simplify $4y + 2x - 3 + 3x + 8$

.....

(2)

(b) Factorise fully $9x^2 - 6xy$

.....

(2)

(c) Expand $4(x + 2)$

.....

(1)

(d) Expand and simplify $(x - 5)(x + 3)$

.....

(2)

(Total for Question 4 is 7 marks)

7 (a) Simplify $2e + 3f - e + 4f$

.....

(2)

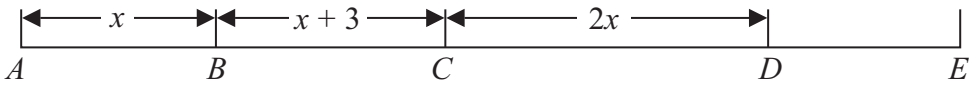
(b) Expand $5(2c + 3d)$

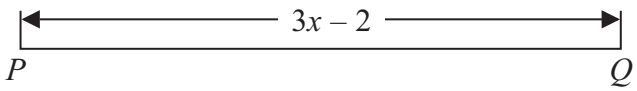
.....

(1)

(c) Here are two straight lines, $ABCDE$ and PQ.

Diagrams **NOT** accurately drawn





In the diagrams all the lengths are in cm.
$AE = 2PQ$.
Find an expression, in terms of x, for the length of DE.
Give your answer in its simplest form.

.....cm

(4)

(Total for Question 7 is 7 marks)

12 (a) Factorise fully $6ab + 10ac$

.....

(2)

(b) Expand and simplify $(x - 5)(x + 7)$

.....

(2)

(c) Simplify $\dfrac{2m^2t^6}{m^4t^2}$

Give your answer in its simplest form.

.....

(2)

(d) Factorise $y^2 - 16$

.....

(1)

(e) Simplify $(h^2)^{-3}$

.....

(1)

(Total for Question 12 is 8 marks)

6 (a) Expand $2m(m + 3)$

.....

(1)

(b) Factorise fully $3xy^2 - 6xy$

.....

(2)

(Total for Question 6 is 3 marks)

21 (a) Expand and simplify $(y - 2)(y - 5)$

.....

(2)

*(b) Prove algebraically that

$$(2n + 1)^2 - (2n + 1) \quad \text{is an even number}$$

for all positive integer values of n.

(3)

(Total for Question 21 is 5 marks)

2 (a) Simplify $3e + 2f - e - 3f$

.....

(2)

(b) Expand $2(3x + 5)$

.....

(2)

(Total for Question 2 is 4 marks)

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

.....

(2)

(b) Factorise fully $4x^2 + 8xy$

.....

(2)

(Total for Question 10 is 4 marks)

12 (a) Factorise $3e^2 + 5e$

.....

(1)

(b) Solve $7(k - 3) = 3k - 5$

$k =$ .....

(3)

(c) Expand and simplify $(2x + 3)(x - 8)$

.....

(2)

(d) Solve $\frac{7 - 3f}{4} = 2$

$f =$ .....

(3)

(Total for Question 12 is 9 marks)

Question 46

21 Expand $(1 + \sqrt{2})(3 - \sqrt{2})$

Give your answer in the form $a + b\sqrt{2}$ where a and b are integers.

.....

(Total for Question 21 is 2 marks)

3 $f = 3g + 7h$

(a) Work out the value of f when $g = -5$ and $h = 2$

$f =$ .....

(2)

(b) Factorise $3x + 6$

.....

(1)

(c) Expand and simplify $5(y - 2) + 2(y - 3)$

.....

(2)

(d) Simplify $m^5 \times m^3$

.....

(1)

(e) Simplify $\frac{p^6}{p^2}$

.....

(1)

(Total for Question 3 is 7 marks)

11 (a) Simplify $2x^3y^5 \times 3x^2y^3$

.....

(2)

(b) Expand and simplify $(2x - 3)(3x - 1)$

.....

(2)

(c) Factorise completely $8x^3y^5 - 12x^4y^2$

.....

(2)

(d) Factorise $2e - 4f + ex - 2fx$

.....

(2)

(Total for Question 11 is 8 marks)

7 (a) Expand $7(x + 5)$

.....

(1)

(b) Expand $3y(4y - 3)$

.....

(1)

(c) Expand and simplify $(t + 2)(t + 4)$

.....

(2)

(Total for Question 7 is 4 marks)

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

.....

(2)

(b) Simplify $\frac{w^5}{w^3}$

.....

(1)

(c) Factorise $5x + 20$

.....

(1)

(Total for Question 7 is 4 marks)

15 (a) Factorise $y^2 - 5y - 14$

.....

(2)

(b) Expand and simplify $(2\sqrt{5} + 1)(3\sqrt{5} - 1)$

.....

(2)

(c) Write $\frac{6}{\sqrt{12}}$ in the form $\sqrt{n}$, where n is an integer.

.....

(2)

(Total for Question 15 is 6 marks)

10 (a) Expand $x(x + 2)$

.....

(1)

(b) Expand and simplify $3(y + 2) + 4(x - 1)$

.....

(2)

(c) Expand and simplify $(2t - 3)(t + 5)$

.....

(2)

(d) Factorise fully $8a^2 + 12a$

.....

(2)

(e) Factorise $y^2 - y - 2$

.....

(2)

(Total for Question 10 is 9 marks)

8 (a) Factorise $12e + 4$

.....

(1)

(b) Expand $5(3c - 2d)$

.....

(1)

(c) Simplify $7a^3b^{-2} \times 4ab^5$

.....

(2)

(d) Factorise $x^2 - 49$

.....

(1)

(e) Expand and simplify $(2y + 7)(y - 3)$

.....

(2)

(Total for Question 8 is 7 marks)

4 (a) Simplify $p^2 \times p^5$

.....

(1)

(b) Simplify $g^6 \div g^4$

.....

(1)

(c) Simplify $(k^3)^2$

.....

(1)

(d) Expand and simplify $3(m + 4) - 2(4m + 1)$

.....

(2)

(e) Factorise $n^2 - 7n$

.....

(1)

(Total for Question 4 is 6 marks)

2 (a) Simplify $3a \times 5b \times 2c$

.....

(1)

(b) Factorise $3y + 6$

.....

(1)

(c) Expand $x(x - 3)$

.....

(1)

(Total for Question 2 is 3 marks)

12 (a) Factorise $2ax - 2ay + bx - by$

.....

(2)

(b) Expand and simplify $(n + 2)^2 + (n - 3)^2$

.....

(3)

(Total for Question 12 is 5 marks)

12 (a) Simplify fully $\dfrac{n^7 \times n^3}{n^6}$

.....

(2)

(b) Expand and simplify $x(x - 2) + 2x(x + 3)$

.....

(2)

(c) Factorise $5y - 15$

.....

(1)

(d) Factorise fully $18ab + 27ab^2$

.....

(2)

(Total for Question 12 is 7 marks)

19 (a) Expand and simplify $(y + 2)(y + 5)$

.....

(2)

(b) Factorise $e^2 + e - 12$

.....

(2)

(c) Solve $3x^2 - x - 1 = 0$
Give your solutions correct to 2 decimal places.

.....

(3)

(Total for Question 19 is 7 marks)

2 (a) Expand and simplify $7a + 4(a - 2b)$

.....

(2)

(b) Simplify $n^6 \times n^5$

.....

(1)

(c) Factorise $5x + 10$

.....

(1)

(Total for Question 2 is 4 marks)

8 (a) Simplify $ab - 5g + 5ab - 2g$

.....

(2)

(b) Factorise $6m - 9$

.....

(1)

(c) Simplify $t^8 \div t^3$

.....

(1)

(d) Factorise fully $2x^2y + 4xy^2$

.....

(2)

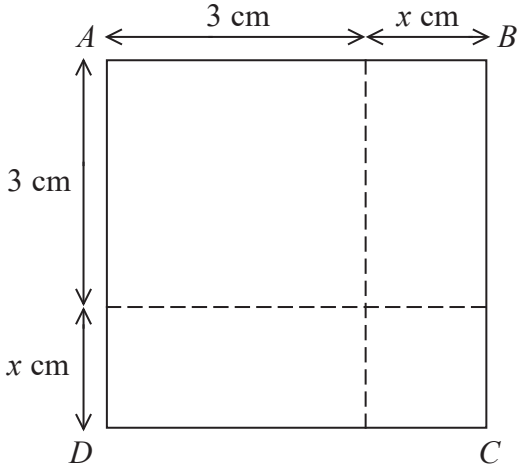
(e) Expand and simplify $(w - 5)^2$

.....

(2)

(Total for Question 8 is 8 marks)

4



The area of square $ABCD$ is 10 cm^2.

Show that $x^2 + 6x = 1$

(Total for Question 4 is 3 marks)

Question 62

10 Show that $(x + 1)(x + 2)(x + 3)$ can be written in the form $ax^3 + bx^2 + cx + d$ where a, b, c and d are positive integers.

(Total for Question 10 is 3 marks)

15 (a) Factorise $a^2 - b^2$

.....

(1)

(b) Hence, or otherwise, simplify fully $(x^2 + 4)^2 - (x^2 - 2)^2$

.....

(3)

(Total for Question 15 is 4 marks)

2 Expand and simplify $5(p + 3) - 2(1 - 2p)$

.....

(Total for Question 2 is 2 marks)

Question 65

November 2018 | 1MA1/3H | Original Q9

9 (a) Expand and simplify $(x - 2)(2x + 3)(x + 1)$

.....

(3)

$$\frac{y^4 \times y^n}{y^2} = y^{-3}$$

(b) Find the value of n.

.....

(2)

(c) Solve $5x^2 - 4x - 3 = 0$
Give your solutions correct to 3 significant figures.

.....

(3)

(Total for Question 9 is 8 marks)

18 (a) Show that $(2x + 1)(x + 3)(3x + 7)$ can be written in the form $ax^3 + bx^2 + cx + d$ where a, b, c and d are integers.

(3)

(b) Solve $(1 - x)^2 < \frac{9}{25}$

.....

(3)

(Total for Question 18 is 6 marks)

Question 67

November 2019 | 1MA1/2H | Original Q15

15 Expand and simplify $(3x + 2)(2x + 1)(x - 5)$

.....

(Total for Question 15 is 3 marks)

Question 68

November 2019 | 1MA1/3H | Original Q1

1 (a) Expand and simplify $(x + 5)(x - 9)$

.....

(2)

(b) Factorise fully $9x^2 + 6x$

.....

(2)

(Total for Question 1 is 4 marks)

Question 69

12 (a) Express $\frac{x}{x+2} + \frac{2x}{x-4}$ as a single fraction in its simplest form.

.....

(3)

(b) Expand and simplify $(x - 3)(2x + 3)(4x + 5)$

.....

(3)

(Total for Question 12 is 6 marks)

Question 70

November 2021 | 1MA1/2H | Original Q12

12 Expand and simplify $(x - 2)(3x + 2)(2x + 3)$

.....

(Total for Question 12 is 3 marks)

Question 71

1 (a) Simplify $(x^3)^5$

.....

(1)

(b) Expand and simplify $4(x + 3) + 7(4 - 2x)$

.....

(2)

(c) Factorise fully $15x^3 + 3x^2y$

.....

(2)

(Total for Question 1 is 5 marks)

14 (a) Factorise fully $4p^2 - 36$

.....

(2)

(b) Show that $(m + 4)(2m - 5)(3m + 1)$ can be written in the form $am^3 + bm^2 + cm + d$ where a, b, c and d are integers.

(3)

(Total for Question 14 is 5 marks)

10 Peter has to subtract $(x^2 - 2x - 4)$ from $(x^2 + 3x + 5)$

Here is his working

$$(x^2 + 3x + 5) - (x^2 - 2x - 4)$$
$$= x^2 + 3x + 5 - x^2 - 2x - 4$$
$$= x + 1$$

Explain what is wrong with Peter's working.

.....

.....

.....

(Total for Question 10 is 1 mark)

14 (a) Simplify fully $(3x^5y^6)^4$

.....

(2)

(b) Expand and simplify $(x + 2)(x - 3)(x + 4)$

.....

(3)

(Total for Question 14 is 5 marks)

Question 75

June 2023 | 1MA1/3H | Original Q1

1 (a) Simplify $(m^2)^3$

.....

(1)

(b) Simplify $x^5 \times x^8$

.....

(1)

(c) Expand $4p(p^2 + 3p)$

.....

(2)

(Total for Question 1 is 4 marks)

Question 76

12 Show that $(x - 1)(x + 3)(x - 5)$ can be written in the form $ax^3 + bx^2 + cx + d$ where a, b, c and d are integers.

(Total for Question 12 is 3 marks)

Question 77

1 (a) Expand and simplify $3(2y - 5) + 7(y + 2)$

.....

(2)

(b) Factorise fully $6x^2 + 15x$

.....

(2)

(c) Make g the subject of the formula $f = 3g + 11$

.....

(2)

(Total for Question 1 is 6 marks)

Question 78

9 Expand and simplify $(x + 7)(x – 2)(x + 3)$

.....

(Total for Question 9 is 3 marks)

Question 79

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14 Expand and simplify $(3x - 1)(2x + 3)(x - 5)$

.....

(Total for Question 14 is 3 marks)

13 Show that $(2x + 3)(x – 1)(x + 2)$ can be written in the form

$ax^3 + bx^2 + cx + d$ where a, b, c and d are integers.

(Total for Question 13 is 3 marks)