



Lesmahagow High School
Mathematics Department

National 5

Algebra Brackets

Corrective Actions

WORKSHEETS

Algebra	
Expand Single Bracket	$3(x + 4) = 3x + 12$
Expand Two Brackets	Use FOIL (Firsts Outsides Insides Lasts) or another suitable method $(x + 3)(x - 2) = x^2 + 3x - 2x - 6 = x^2 + x - 6$
	Know that every term in the first bracket must multiply every term in the second. e.g. $(x + 2)(x^2 - 3x - 4) = x^3 - 3x^2 - 4x + 2x^2 - 6x - 8$ $= x^3 - x^2 - 10x - 8$
Simplify Expression	Put together the terms that are the same: e.g. $x^2 + 4x + 3 - 2x + 8 = x^2 + 2x + 11$ $a \times a \times a = a^3$



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N5

Algebra

Expanding

Brackets

<https://www.national5maths.co.uk/free-national-5-maths-2/>

ALGEBRAIC EXPRESSIONS with BRACKETS

1. Multiply out the brackets:

(a) $3(x - 5)$ (b) $5(y + 7)$ (c) $8(a + 6)$ (d) $6(3 + t)$

(e) $x(x + 9)$ (f) $y(3 - y)$ (g) $b(b - 4)$ (h) $p(5 + p)$

(i) $a(b + c)$ (j) $x(x - y)$ (k) $p(q - r)$ (l) $a(a + x)$

2. Expand the brackets:

(a) $4(2a + 5)$ (b) $7(3y - 4)$ (c) $2(12x + 11)$ (d) $9(4c - 7)$

(e) $2a(a + 3)$ (f) $5x(x - 8)$ (g) $10y(3 - y)$ (h) $3t(t + 6)$

(i) $3x(2x - 9)$ (j) $2y(7 - 5y)$ (k) $4b(3b - 8)$ (l) $5x(5x + 4)$

3. Expand and simplify:

(a) $3(3a - 1) + 2a$ (b) $2(5x + 3) - 3x$ (c) $8(b + 2) - 9$

(d) $4(2h - 1) + 7$ (e) $5(3 - 4x) + 11x$ (f) $3(2c + 1) - 8$

(g) $2(4t + 3) - 10t$ (h) $p(p + q) - 3pq$ (i) $7(1 - 3c) - 10$

(j) $3 + 2(2x + 5)$ (k) $7a + 3(2a - 3)$ (l) $5 - 2(2x - 7)$

(m) $6 + 5(3y - 2)$ (n) $9b - 2(4b - 1)$ (o) $8 - 3(5x + 7)$

(p) $12x - 4(4x - 5)$ (q) $3c + 5(1 - 2c)$ (r) $7 - 2(5a - 12)$

4. Multiply out the brackets:

(a) $(x + 2)(x + 3)$ (b) $(y + 5)(y + 2)$ (c) $(a + 4)(a + 6)$

(d) $(b + 3)(b + 4)$ (e) $(x + 9)(x + 5)$ (f) $(s + 3)(s + 8)$

(g) $(y + 7)(y + 4)$ (h) $(b + 3)(b + 3)$ (i) $(c + 6)(c + 7)$

(j) $(a + 8)(a + 4)$ (k) $(y + 4)(y + 2)$ (l) $(x + 9)(x + 8)$

(m) $(p + 12)(p + 7)$ (n) $(c + 5)(c + 6)$ (o) $(t + 7)(t + 9)$

(p) $(x + 4)(x + 9)$ (q) $(y + 12)(y + 5)$ (r) $(a + 11)(a + 9)$

5. Multiply out the brackets:

(a) $(x - 1)(x - 5)$

(b) $(c - 4)(c - 2)$

(c) $(y - 3)(y - 7)$

(d) $(b - 6)(b - 8)$

(e) $(x - 5)(x - 2)$

(f) $(s - 8)(s - 5)$

(g) $(y - 2)(y - 9)$

(h) $(a - 4)(a - 4)$

(i) $(t - 3)(t - 6)$

(j) $(x - 6)(x - 5)$

(k) $(b - 5)(b - 3)$

(l) $(c - 10)(c - 4)$

(m) $(a - 3)(a - 9)$

(n) $(y - 8)(y - 7)$

(o) $(x - 12)(x - 3)$

(p) $(s - 4)(s - 7)$

(q) $(d - 1)(d - 15)$

(r) $(b - 10)(b - 1)$

6. Multiply out the brackets:

(a) $(x - 1)(x + 5)$

(b) $(a + 3)(a - 7)$

(c) $(t - 5)(t + 4)$

(d) $(y + 8)(y - 4)$

(e) $(c + 2)(c - 7)$

(f) $(x - 6)(x + 1)$

(g) $(b - 2)(b + 9)$

(h) $(p - 10)(p + 2)$

(i) $(y - 8)(y + 7)$

(j) $(z + 4)(z - 6)$

(k) $(x + 1)(x - 1)$

(l) $(a + 2)(a - 15)$

(m) $(c - 3)(c + 3)$

(n) $(p - 7)(p + 1)$

(o) $(b + 10)(b - 5)$

7. Multiply out the brackets:

(a) $(x + 3)^2$

(b) $(w - 2)^2$

(c) $(a - 5)^2$

(d) $(c + 8)^2$

(e) $(y - 4)^2$

(f) $(a + 6)^2$

(g) $(b + 1)^2$

(h) $(s + 7)^2$

(i) $(b - 9)^2$

(j) $(x - 10)^2$

(k) $(c - 1)^2$

(l) $(y - 3)^2$

(m) $(2x - 1)^2$

(n) $(5y + 2)^2$

(o) $(3x + 4)^2$

(p) $(4b - 5)^2$

8. Multiply out the brackets:

(a) $(a + b)(c + d)$

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

(c) $(a + 4)(b + 5)$

(d) $(p - q)(r - s)$

(e) $(1 - a)(7 - b)$

(f) $(c - 6)(d + 8)$

9. Multiply out the brackets:

(a) $x(x^2 + x - 1)$

(b) $3(2x^2 - 3x + 5)$

(c) $x(3x^2 - 5x + 8)$

(d) $2x(x^2 + 2x + 3)$

(e) $-5(x^2 - 8x + 2)$

(f) $x(x^2 - 4x - 7)$

10. Multiply out the brackets and simplify:

(a) $(x + 2)(x^2 + 3x + 1)$

(b) $(x + 5)(x^2 + 4x + 2)$

(c) $(x + 1)(x^2 + 5x + 4)$

(d) $(x + 3)(x^2 + x + 5)$

(e) $(x + 8)(x^2 + 2x + 3)$

(f) $(x + 4)(x^2 + 7x + 6)$

(g) $(x + 12)(x^2 + x + 7)$

(h) $(x + 10)(x^2 + 3x + 9)$

11. Multiply out the brackets and simplify:

(a) $(x - 1)(x^2 + x + 1)$

(b) $(x - 7)(x^2 + 3x + 5)$

(c) $(x - 2)(x^2 + 4x + 3)$

(d) $(x - 4)(x^2 + 6x + 1)$

(e) $(x - 3)(x^2 - 2x + 5)$

(f) $(x - 6)(x^2 - 5x + 2)$

(g) $(x - 4)(x^2 - x + 2)$

(h) $(x - 1)(x^2 - 2x + 7)$

12. Multiply out the brackets and simplify:

(a) $(x + 5)(2x^2 + 4x + 9)$

(b) $(x - 3)(5x^2 + x + 6)$

(c) $(x - 2)(6x^2 - 5x + 7)$

(d) $(x + 7)(3x^2 + 9x - 2)$

(e) $(x - 4)(5x^2 - x - 8)$

(f) $(x + 1)(7x^2 - 2x + 11)$

(g) $(2x + 1)(3x^2 + 4x + 1)$

(h) $(3x + 4)(x^2 - 11x + 2)$

(i) $(5x - 2)(2x^2 + 3x - 7)$

(j) $(4x - 3)(3x^2 - 5x - 4)$

13. Expand and simplify each of the following expressions:

(a) $3(x - 4) + (x + 2)^2$

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

(c) $(2x + 3)^2 - 4(x + 1)$

(d) $-(x + 2)^2 + 4x$

(e) $-3(2x - 1)^2 + 12x^2$

(f) $(x - 3)(x + 2) - (x + 4)^2$

(g) $3x(x - 4) - (x + 2)(x - 4)$

(h) $(x + 2)^2 + (2x - 1)^2 - (x + 3)$



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Solutions

<https://www.national5maths.co.uk/free-national-5-maths-2/>

2.1 ALGEBRAIC EXPRESSIONS with BRACKETS

1. (a) $3x - 15$ (b) $5y + 35$ (c) $8a + 48$ (d) $18 + 6t$
(e) $x^2 + 9x$ (f) $3y - y^2$ (g) $b^2 - 4b$ (h) $5p + p^2$
(i) $ab + ac$ (j) $x^2 - xy$ (k) $pq - pr$ (l) $a^2 + ax$
2. (a) $8a + 20$ (b) $21y - 28$ (c) $24x + 22$ (d) $36c - 63$
(e) $2a^2 + 6a$ (f) $5x^2 - 40x$ (g) $30y - 10y^2$ (h) $3t^2 + 18t$
(i) $6x^2 - 27x$ (j) $14y - 10y^2$ (k) $12b^2 - 32b$ (l) $25x^2 + 20x$
3. (a) $11a - 3$ (b) $7x + 6$ (c) $8b + 7$ (d) $8h + 3$
(e) $15 - 9x$ (f) $6c - 5$ (g) $-2t + 6$ (h) $p^2 - 2pq$
(i) $-3 - 21c$ (j) $13 + 4x$ (k) $13a - 9$ (l) $19 - 4x$
(m) $-4 + 15y$ (n) $b + 2$ (o) $-13 - 15x$ (p) $-4x + 20$
(q) $-7c + 5$ (r) $31 - 10a$
4. (a) $x^2 + 5x + 6$ (b) $y^2 + 7y + 10$ (c) $a^2 + 10a + 24$
(d) $b^2 + 7b + 12$ (e) $x^2 + 14x + 45$ (f) $s^2 + 11s + 24$
(g) $y^2 + 11y + 28$ (h) $b^2 + 6b + 9$ (i) $c^2 + 13c + 42$
(j) $a^2 + 12a + 32$ (k) $y^2 + 6y + 8$ (l) $x^2 + 17x + 72$
(m) $p^2 + 19p + 84$ (n) $c^2 + 11c + 30$ (o) $t^2 + 16t + 63$
(p) $x^2 + 13x + 36$ (q) $y^2 + 17y + 60$ (r) $a^2 + 20a + 19$
5. (a) $x^2 - 6x + 5$ (b) $c^2 - 6c + 8$ (c) $y^2 - 10y + 21$
(d) $b^2 - 14b + 48$ (e) $x^2 - 7x + 10$ (f) $s^2 - 13s + 40$
(g) $y^2 - 11y + 18$ (h) $a^2 - 8a + 16$ (i) $t^2 - 9t + 18$
(j) $x^2 - 11x + 30$ (k) $b^2 - 8b + 15$ (l) $c^2 - 14c + 40$
(m) $a^2 - 12a + 27$ (n) $y^2 - 15y + 56$ (o) $x^2 - 15x + 36$
(p) $s^2 - 11s + 28$ (q) $d^2 - 16d + 15$ (r) $b^2 - 11b + 10$

6. (a) $x^2 + 4x - 5$ (b) $a^2 - 4a - 21$ (c) $t^2 - t - 20$
 (d) $y^2 + 4y - 32$ (e) $c^2 - 5c - 14$ (f) $x^2 - 5x - 6$
 (g) $b^2 + 7b - 18$ (h) $p^2 - 8p - 20$ (i) $y^2 - y - 56$
 (j) $z^2 - 2z - 24$ (k) $x^2 - 1$ (l) $a^2 - 13a - 30$
 (m) $c^2 - 9$ (n) $p^2 - 6p - 7$ (o) $b^2 + 5b - 50$
7. (a) $x^2 + 6x + 9$ (b) $w^2 - 4w + 4$ (c) $a^2 - 10a + 25$
 (d) $c^2 + 16c + 64$ (e) $y^2 - 8y + 16$ (f) $a^2 + 12a + 36$
 (g) $b^2 + 2b + 1$ (h) $s^2 + 14s + 49$ (i) $b^2 - 18b + 81$
 (j) $x^2 - 20x + 100$ (k) $c^2 - 2c + 1$ (l) $y^2 - 6y + 9$
 (m) $4x^2 - 4x + 1$ (n) $25y^2 + 20y + 4$ (o) $9x^2 + 24x + 16$
 (p) $16b^2 - 40b + 25$
8. (a) $ac + bc + ad + bd$ (b) $6 + 3x + 2y + xy$ (c) $ab + 4b + 5a + 20$
 (d) $pr - qr - ps + qs$ (e) $7 - 7a - b + ab$ (f) $cd - 6d + 8c - 48$
9. (a) $x^3 + x^2 - x$ (b) $6x^2 - 9x + 15$ (c) $3x^3 - 5x^2 + 8x$
 (d) $2x^3 + 4x^2 + 6x$ (e) $-5x^2 + 40x - 10$ (f) $x^3 - 4x^2 - 7x$
10. (a) $x^3 + 5x^2 + 7x + 2$ (b) $x^3 + 9x^2 + 22x + 10$
 (c) $x^3 + 6x^2 + 9x + 4$ (d) $x^3 + 4x^2 + 8x + 15$
 (e) $x^3 + 10x^2 + 19x + 24$ (f) $x^3 + 11x^2 + 34x + 24$
 (g) $x^3 + 13x^2 + 19x + 84$ (h) $x^3 + 13x^2 + 39x + 90$
 (i) $x^3 + 21x^2 + 115x + 63$ (j) $x^3 + 16x^2 + 64x + 7$
 (k) $x^3 - 2x^2 - 13x + 6$ (l) $x^3 - 7x^2 + 17x - 66$
 (m) $x^3 - 6x^2 - 13x + 6$ (n) $x^3 - x^2 - 23x + 35$
 (o) $x^3 + 13x^2 + 24x - 60$ (p) $x^3 + 14x^2 + 39x - 54$
 (q) $x^3 + 12x^2 + 9x - 22$ (r) $x^3 + 15x^2 + 53x - 21$

- 11.** (a) $x^3 - 1$ (b) $x^3 - 4x^2 - 16x - 35$
(c) $x^3 + 2x^2 - 5x - 6$ (d) $x^3 + 2x^2 - 23x - 4$
(e) $x^3 - 5x^2 + 11x - 15$ (f) $x^3 - 11x^2 + 32x - 12$
(g) $x^3 - 5x^2 + 6x - 8$ (h) $x^3 - 3x^2 + 9x - 7$
(i) $x^3 - 6x^2 - 29x + 18$ (j) $x^3 + 3x^2 - 34x - 30$
(k) $x^3 - 7x^2 - 15x + 56$ (l) $x^3 + 6x^2 - 39x + 36$
(m) $x^3 - 9x^2 + 19x + 5$ (n) $x^3 - 13x^2 + 22x + 80$
(o) $x^3 - 13x^2 + 40x + 12$ (p) $x^3 - 18x^2 + 4x + 13$
- 12.** (a) $2x^3 + 14x^2 + 29x + 45$ (b) $5x^3 - 14x^2 + 3x - 18$
(c) $6x^3 - 17x^2 + 17x - 14$ (d) $3x^3 + 30x^2 + 61x - 14$
(e) $5x^3 - 21x^2 - 4x + 32$ (f) $7x^3 + 5x^2 + 9x + 11$
(g) $6x^3 + 11x^2 + 6x + 1$ (h) $3x^3 - 29x^2 - 38x + 8$
(i) $10x^3 + 11x^2 - 41x + 14$ (j) $12x^3 - 29x^2 - x + 12$
- 13.** (a) $x^2 + 7x - 8$ (b) $4x^2 - x - 3$ (c) $4x^2 + 8x + 5$
(d) $-x^2 - 4$ (e) $12x - 3$ (f) $-9x - 22$
(g) $2x^2 - 10x + 8$ (h) $5x^2 - x + 2$ (i) $21 + 8x - 4x^2$
(j) $3x^3 + 20x^2 + 21x$ (k) $2x^3 - x^2 - 2x + 9$ (l) $1 - 3x - x^2 - x^3$