



Lesmahagow High School  
Mathematics Department

# S2

# Algebra

1. Write each of the following in a shorter form:

(a)  $3x + 2x$

(b)  $4p + 2p + 6p$

(c)  $8a - 3$

(d)  $5m + 3m - 2m$

(e)  $3v + v$

(f)  $4y + 6y - y$

(g)  $5a + 4a + 6$

(h)  $9f - 4f + 6$

(i)  $8x + 3 + 2x$

(j)  $4c + 6 + 3$

(k)  $5m + 3 + 4m$

(l)  $4y + 5 + 2y$

(m)  $8 + 3x - 4$

(n)  $7d + 6 - 3d$

(o)  $5y + 6z + y$

(p)  $6a + 5b - 2a$

(q)  $12 + 7x - 7$

(r)  $5g + 6h + 4g$

(s)  $5r + 8 - 2$

(t)  $6x + 3 + 3x$

(u)  $8y - 4 + y$

2. Write each of the following in a shorter form:

(a)  $3x + 4x + 3y + 4y$

(b)  $4a + 5b + 6c + 7c$

(c)  $4a + 3a + 4b + 2b$

(d)  $2g + 4g + 3k + 2k$

(e)  $3m + 4m + 2p + 8p$

(f)  $7q + 3q + 2r + 4r$

(g)  $3x + 2 - 8x$

(h)  $2a + 4 - a + 4$

(i)  $7k - 3k - 4p - 2p$

(j)  $9n - 4n + 3p - p$

(k)  $15t + 16b - 5t - 4b$

(l)  $20r + 18r + 5r - 9s$

(m)  $24r + 17w - 16r - 2w$

(n)  $6x + 3 - 3x - 5x$

3. Simplify the following expressions:

(a)  $0.3x + 0.2x$

(b)  $1.4p + 1.2p + 1.6p$

(c)  $5.4a - 3a$

(d)  $2.5m + 3.3m - 2.7m$

(e)  $3.2v - 2.9v$

(f)  $2.4y + 6g - 1.1y$

(g)  $\frac{1}{2}a + \frac{1}{2}a + 6a$

(h)  $\frac{2}{3}f - \frac{1}{3}f + 6$

(i)  $\frac{3}{5}x + 3 + \frac{2}{5}x$

(j)  $\frac{3}{4}c + \frac{1}{2}c + 3c$

(k)  $\frac{5}{8}m + 3 + \frac{7}{8}m$

(l)  $\frac{2}{3}y + 5 + \frac{2}{3}y$

(m)  $1\frac{2}{3}x + \frac{1}{2}x - \frac{2}{3}x$

(n)  $2\frac{4}{7}d + \frac{2}{7}d - 2d$

(o)  $3\frac{2}{3}y + \frac{5}{6}z + \frac{1}{3}y$

## Removing Brackets

1. Remove the brackets:

- |     |            |     |            |     |             |     |             |
|-----|------------|-----|------------|-----|-------------|-----|-------------|
| (a) | $4(c + 2)$ | (b) | $2(e + 4)$ | (c) | $5(f + 6)$  | (d) | $3(t + 8)$  |
| (e) | $7(g + 3)$ | (f) | $9(w + 1)$ | (g) | $6(h + 6)$  | (h) | $8(p + 2)$  |
| (i) | $3(2 + y)$ | (j) | $7(1 + k)$ | (k) | $5(5 + z)$  | (l) | $3(2 + y)$  |
| (m) | $9(1 + e)$ | (n) | $3(2 + w)$ | (o) | $8(12 + r)$ | (p) | $10(7 + m)$ |

2. Multiply out the brackets:

- |     |             |     |            |     |             |     |             |
|-----|-------------|-----|------------|-----|-------------|-----|-------------|
| (a) | $2(x + 5)$  | (b) | $5(y + 7)$ | (c) | $3(a + 6)$  | (d) | $6(x + 4)$  |
| (e) | $4(x + 9)$  | (f) | $3(c + 8)$ | (g) | $7(d + 3)$  | (h) | $5(m + 5)$  |
| (i) | $2(y + 14)$ | (j) | $6(a + 3)$ | (k) | $8(q + 5)$  | (l) | $7(a + 7)$  |
| (m) | $9(b + 2)$  | (n) | $4(x + 8)$ | (o) | $5(p + 10)$ | (p) | $3(w + 11)$ |

3. Multiply out the brackets:

- |     |             |     |            |     |             |     |             |
|-----|-------------|-----|------------|-----|-------------|-----|-------------|
| (a) | $2(a - 7)$  | (b) | $3(x - 5)$ | (c) | $6(q - 3)$  | (d) | $4(y - 4)$  |
| (e) | $5(b - 4)$  | (f) | $4(p - 7)$ | (g) | $8(y - 2)$  | (h) | $3(w - 7)$  |
| (i) | $8(c - 4)$  | (j) | $7(d - 6)$ | (k) | $5(s - 8)$  | (l) | $2(x - 15)$ |
| (m) | $10(w - 2)$ | (n) | $5(c - 5)$ | (o) | $3(a - 10)$ | (p) | $7(q - 5)$  |

4. Multiply out the brackets:

- |     |            |     |            |     |            |     |             |
|-----|------------|-----|------------|-----|------------|-----|-------------|
| (a) | $3(x - 5)$ | (b) | $5(y + 7)$ | (c) | $8(a + 6)$ | (d) | $6(3 + t)$  |
| (e) | $6(x + 9)$ | (f) | $9(3 - y)$ | (g) | $7(b - 4)$ | (h) | $4(5 + p)$  |
| (i) | $2(b + c)$ | (j) | $8(x - y)$ | (k) | $5(q - r)$ | (l) | $3(a + x)$  |
| (m) | $5(b - c)$ | (n) | $3(x - z)$ | (o) | $6(a - m)$ | (p) | $10(p - q)$ |

5. Expand the brackets:

- (a)  $4(2a + 5)$     (b)  $7(3y + 4)$     (c)  $2(12x + 11)$     (d)  $9(4c + 7)$   
(e)  $2(3a + 4)$     (f)  $5(2x + 7)$     (g)  $10(3 + 2y)$     (h)  $3(5t + 6)$   
(i)  $3(2x + 9)$     (j)  $2(7 + 5y)$     (k)  $4(3b + 8)$     (l)  $5(5x + 4)$

6. Expand the brackets:

- (a)  $2(4a - 3)$     (b)  $6(4y - 3)$     (c)  $3(2x - 5)$     (d)  $4(5c - 6)$   
(e)  $7(2a - 1)$     (f)  $2(8x - 3)$     (g)  $5(6 - 7y)$     (h)  $3(8t - 5)$   
(i)  $3(9x - 4)$     (j)  $8(7 - 5y)$     (k)  $7(2b - 9)$     (l)  $2(12x - 7)$

7. Remove the brackets:

- (a)  $5(2c + 5)$     (b)  $2(2e + 4)$     (c)  $6(4f - 6)$     (d)  $3(2t + 8)$   
(e)  $2(8g - 2)$     (f)  $6(4w + 1)$     (g)  $7(5h - 6)$     (h)  $8(3p - 2)$   
(i)  $3(3 - 2y)$     (j)  $7(1 + 9k)$     (k)  $5(5 - 10z)$     (l)  $4(6 - 7u)$   
(m)  $9(1 + 3e)$     (n)  $3(2 - 6w)$     (o)  $3(12 + 2r)$     (p)  $4(7 + 5m)$

8. Remove the brackets and simplify where possible:

- (a)  $3(c + 2) + 7$     (b)  $2(e + 4) - 7$     (c)  $6(f + 4) - 7f$   
(d)  $4(t + 8) - 7$     (e)  $7(g - 3) + 5g$     (f)  $8(w - 1) - 3w$   
(g)  $6(h + 2) + 9$     (h)  $9(p + 3) + 5p$     (i)  $3(2 + f) - 4$   
(j)  $4(7 - u) - 15$     (k)  $5(5 + p) - 2p$     (l)  $4(7 - u) - 15$   
(m)  $6(1 + e) + e$     (n)  $3(6 + w) + w$     (o)  $8(11 + q) - 4q$   
(p)  $6(3g + 2) + 7$     (q)  $2(2e + 4) - 3$     (r)  $7(4c + 5) - 20c$   
(s)  $3(2t + 8) - t$     (t)  $3(8f + 3) - 4$     (u)  $3(4a + 1) - 4$   
(v)  $5(2 + 2t) + 3t$     (w)  $4(1 + 9u) + 2u$     (x)  $(6 + 5x) - x$   
(y)  $3(10 + 2d) - 5d$     (z)  $5(4 + 7u) - 28$

**9.** Expand and simplify:

**(a)**  $2a + 3(a + 5)$

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

**(c)**  $4b + 8(b + 2)$

**(d)**  $5h + 4(2h + 1)$

**(e)**  $11x + 5(3x + 4)$

**(f)**  $10c + 3(2c + 1)$

**(g)**  $2(4t + 3) + 10t$

**(h)**  $3(5p + 4) + 7p$

**(i)**  $7(1 + 3c) + 10$

**10.** 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)**  $8(2p + 3) - 3p$

**(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)**  $7 + 2(5a - 12)$

## Simplifying an expression which has more than one variable

### EXAM QUESTIONS

1. Multiply out the brackets and simplify

$$9 - 2(3x - 4)$$

2. Multiply brackets and simplify

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

3. Multiply brackets and simplify

$$5 + 2(3g - 4) - 7g$$

4. Multiply out the brackets and collect like terms

$$17 + 4(3p - 2) + 3p$$

5. Multiply out the brackets and collect like terms

$$8 + 3(2 - 3k)$$

6. Multiply out the brackets and simplify:

$$9d - 5(4 - 3d)$$

### Simplifying an expression which has more than one variable

1. (a)  $5x$  (b)  $12p$  (c)  $8a - 3$  (d)  $6m$   
(e)  $4v$  (f)  $9y$  (g)  $9a + 6$  (h)  $5f + 6$   
(i)  $10x + 3$  (j)  $4c + 9$  (k)  $9m + 3$  (l)  $6y + 5$   
(m)  $4 + 3x$  (n)  $4d + 6$  (o)  $6y + 6z$  (p)  $4a + 5b$   
(q)  $5 + 7x$  (r)  $9g + 6h$  (s)  $5r + 6$  (t)  $9x + 3$   
(u)  $9y - 4$
2. (a)  $7x + 7y$  (b)  $4a + 5b + 13c$  (c)  $7a + 6b$  (d)  $6g + 5k$   
(e)  $7m + 10p$  (f)  $10q + 6r$  (g)  $-5x + 2$  (h)  $a + 8$   
(i)  $4k - 6p$  (j)  $5n + 2p$  (k)  $10t + 12b$  (l)  $43r - 9s$   
(m)  $8r + 15w$  (n)  $3 - 2x$
3. (a)  $0.5x$  (b)  $4.2p$  (c)  $2.4a$  (d)  $3.1m$   
(e)  $0.3v$  (f)  $1.3y + 6g$  (g)  $7a$  (h)  $\frac{1}{3}f + 6$   
(i)  $x + 3$  (j)  $4\frac{1}{4}c$  (k)  $1\frac{1}{2}m + 3$  (l)  $1\frac{1}{3}y + 5$   
(m)  $1\frac{1}{2}x$  (n)  $\frac{6}{7}d$  (o)  $4y + \frac{5}{6}z$

### Using the distributive law in an expression with a numerical common factor to produce a sum of terms

1. (a)  $4c + 8$  (b)  $2e + 8$  (c)  $5f + 30$  (d)  $3t + 24$   
(e)  $7g + 21$  (f)  $9w + 9$  (g)  $6h + 36$  (h)  $8p + 16$   
(i)  $6 + 3y$  (j)  $7 + 7k$  (k)  $25 + 5z$  (l)  $6 + 3y$   
(m)  $9 + 9e$  (n)  $6 + 3w$  (o)  $96 + 8r$  (p)  $70 + 10m$
2. (a)  $2x + 10$  (b)  $5y + 35$  (c)  $3a + 18$  (d)  $6x + 24$   
(e)  $4x + 36$  (f)  $3c + 24$  (g)  $7d + 21$  (h)  $5m + 25$   
(i)  $2y + 28$  (j)  $6a + 18$  (k)  $8q + 40$  (l)  $7a + 49$   
(m)  $9b + 18$  (n)  $4x + 32$  (o)  $5p + 50$  (p)  $3w + 33$
3. (a)  $2a - 14$  (b)  $3x - 15$  (c)  $6q - 18$  (d)  $4y - 16$

- |     |     |            |     |            |     |            |     |             |
|-----|-----|------------|-----|------------|-----|------------|-----|-------------|
|     | (e) | $5b - 20$  | (f) | $4p - 28$  | (g) | $8y - 16$  | (h) | $3w - 21$   |
|     | (i) | $8c - 32$  | (j) | $7d - 42$  | (k) | $5s - 40$  | (l) | $2x - 30$   |
|     | (m) | $10w - 20$ | (n) | $5c - 25$  | (o) | $3a - 30$  | (p) | $7q - 35$   |
| 4.  | (a) | $3x - 15$  | (b) | $5y + 35$  | (c) | $8a + 48$  | (d) | $18 + 6t$   |
|     | (e) | $6x + 54$  | (f) | $27 - 9y$  | (g) | $7b - 28$  | (h) | $20 + 4p$   |
|     | (i) | $2b + 2c$  | (j) | $8x - 8y$  | (k) | $5q - 5r$  | (l) | $3a + 3x$   |
|     | (m) | $5b - 5c$  | (n) | $3x - 3z$  | (o) | $6a - 6m$  | (p) | $10p - 10q$ |
| 5.  | (a) | $8a + 20$  | (b) | $21y + 28$ | (c) | $24x + 22$ | (d) | $36c + 63$  |
|     | (e) | $6a + 8$   | (f) | $10x + 35$ | (g) | $30 + 20y$ | (h) | $15t + 18$  |
|     | (i) | $6x + 27$  | (j) | $14 + 10y$ | (k) | $12b + 32$ | (l) | $25x + 20$  |
| 6.  | (a) | $8a - 6$   | (b) | $24y - 18$ | (c) | $6x - 15$  | (d) | $20c - 24$  |
|     | (e) | $14a - 7$  | (f) | $16x - 6$  | (g) | $30 - 35y$ | (h) | $24t - 15$  |
|     | (i) | $27x - 12$ | (j) | $56 - 40y$ | (k) | $14b - 63$ | (l) | $24x - 14$  |
| 7.  | (a) | $10c + 25$ | (b) | $4e + 8$   | (c) | $24f - 36$ | (d) | $6t + 24$   |
|     | (e) | $16g - 4$  | (f) | $24w + 6$  | (g) | $35h - 42$ | (h) | $24p - 16$  |
|     | (i) | $9 - 6y$   | (j) | $7 + 63k$  | (k) | $25 - 50z$ | (l) | $24 - 28u$  |
|     | (m) | $9 + 27e$  | (n) | $6 - 18w$  | (o) | $36 + 6r$  | (p) | $28 + 20m$  |
| 8.  | (a) | $3c + 13$  | (b) | $2e + 1$   | (c) | $24 - f$   | (d) | $4t + 25$   |
|     | (e) | $12g - 21$ | (f) | $5w - 8$   | (g) | $6h + 21$  | (h) | $14p + 27$  |
|     | (i) | $2 + 3f$   | (j) | $13 - 4u$  | (k) | $25 + 3p$  | (l) | $13 - 4u$   |
|     | (m) | $6 + 7e$   | (n) | $18 + 4w$  | (o) | $88 + 4q$  | (p) | $18g + 19$  |
|     | (q) | $4e + 5$   | (r) | $8c + 35$  | (s) | $5t + 24$  | (t) | $24f + 5$   |
|     | (u) | $12a - 1$  | (v) | $10 + 13t$ | (w) | $4 + 38u$  | (x) | $6 + 4x$    |
|     | (y) | $30 + d$   | (z) | $35u - 8$  |     |            |     |             |
| 9.  | (a) | $5a + 15$  | (b) | $5x + 6$   | (c) | $12b + 16$ | (d) | $13h + 4$   |
|     | (e) | $26x + 20$ | (f) | $16c + 3$  | (g) | $18t + 6$  | (h) | $22p + 12$  |
|     | (i) | $17 + 21c$ |     |            |     |            |     |             |
| 10. | (a) | $11a - 3$  | (b) | $7x + 6$   | (c) | $8b - 9$   | (d) | $8h + 3$    |



- (e)  $15 - 9x$       (f)  $6c - 5$       (g)  $6 - 2t$       (h)  $13p + 24$   
(i)  $16 - 21c$       (j)  $13 + 4x$       (k)  $13a - 9$       (l)  $4x - 9$   
(m)  $15y - 4$       (n)  $17b - 2$       (o)  $15x + 29$       (p)  $28x - 20$   
(q)  $5 - 7c$       (r)  $10a - 17$

### **EXAM QUESTIONS**

1.  $17 - 6x$       2.  $8 + 3x$       3.  $-g - 3$   
4.  $15p + 9$       5.  $14 - 9k$       6.  $24d - 20$