# Practice Book *UNIT 8 Algebra: Brackets* Answers

## 8.1 Expansion of Single Brackets

1. (a) 11 (b) $-8$ (c) $-11$ (d) 15
   (e) $-7$ (f) 24 (g) $-56$ (h) $-22$
   (i) $-12$ (j) $-35$ (k) 49 (l) 44

2. (a)

| $\times$ | $x$ | 2 |
|---|---|---|
| 4 | $4x$ | 8 |

$4(x+2) = 4x + 8$

| $\times$ | $x$ | $-7$ |
|---|---|---|
| 5 | $5x$ | $-35$ |

$5(x-7) = 5x - 35$

| $\times$ | $x$ | 3 |
|---|---|---|
| 4 | $4x$ | 12 |

$4(x+3) = 4x + 12$

| $\times$ | $2x$ | 5 |
|---|---|---|
| 5 | $10x$ | 25 |

$5(2x+5) = 10x + 25$

3. (a) $4x + 24$ (b) $3x - 12$ (c) $10x + 30$ (d) $21x - 28$
   (e) $6x + 12$ (f) $24x - 72$ (g) $-2x + 8$ (h) $-24 + 6x$
   (i) $15x - 20$ (j) $18x + 72$

4. $3(4x - 8) = 12x - 24$ Whole bracket is multiplied out each time.

5. (a)

| $\times$ | $x$ | $-2$ |
|---|---|---|
| $x$ | $x^2$ | $-2x$ |

$x(x-2) = x^2 - 2xy$

| $\times$ | $x$ | $-y$ |
|---|---|---|
| $x$ | $x^2$ | $-xy$ |

$x(x-y) = x^2 - xy$

6. (a) $4x(x+8) = 4x^2 + 32$ (b) $(-3)(2x-7) = -6x - 42x$
   (c) $4x(x-9) = 4x^2 - 36x$ (d) $6x(x-7) = 6x^2 - 42x$
   (e) $3x(x-y) = 3x^2 - 3xy$ (f) $-4x(2x+8) = -8x^2 - 32x$

7. (a) $x^2 - 7x$ (b) $8x - 2x^2$ (c) $6x^2 + 12x$ (d) $12x^2 - 20x$
   (e) $x^2 + xy$ (f) $4xy - 3x^2$ (g) $4x^2 + 6xy$ (h) $10xy - 5x$

8. (a) $2(x+4)$ $= 2x + 8$ (b) $12(x-5)$ $= 12x - 60$ (c) $2x(x+9)$ $= 2x^2 + 18x$ (d) $2x(5+x)$ $= 10x + 2x^2$
   (e) $2x(3x+2)$ $= 6x^2 + 4x$ (f) $4x(6-2x)$ $= 24x - 8x^2$

9. $\frac{1}{2} \times x \times (x+2)$ (b) $\frac{1}{2}x^2 + x$

# 8.1 Answers

10. (a) $2x \times 2x \times (3x - 5)$ (b) $12x^3 - 20x^2$

## 8.2 Linear Equations

1. (a) $x = 1$ (b) $x = 16$ (c) $x = -1$ (d) $x = 2$
   (e) $x = 2.5$ or $\frac{5}{2}$ (f) $x = 7\frac{2}{3}$ or $\frac{23}{3}$ (g) $x = 6.4$ or $\frac{32}{5}$ (h) $x = 1.2$ or $\frac{6}{5}$

2. (a) $x = 4.3$ or $\frac{43}{10}$ (b) $x = 1$ (c) $x = 4.5$ or $\frac{9}{2}$ (d) $x = 7.5$ or $\frac{15}{2}$

3. $3(x + 4) = 18 \Rightarrow x = 2$

4. (a) $5(x + 7) = 55$ (b) $x = 4$

5. (a) $4(x + 6) = 17$ (b) $x = -1.75$ or $-\frac{7}{4}$

6. (a) $x = 2$ (b) $x = 4$ (c) $x = 1$ (d) $x = 1$
   (e) $x = 0.5$ or $\frac{1}{2}$ (f) $x = 1\frac{2}{3}$ or $\frac{5}{3}$

7. $5(11 - x) = 45 \Rightarrow x = 2$

8. (a) $x = 5$ (b) $x = \frac{3}{2}$ or $1\frac{1}{2}$ (c) $x = 1.2$ or $\frac{6}{5}$ (d) $x = 2$

9. (a) Area $= \frac{1}{2} \times 3 \times (x + 4) = \frac{3}{2}(x + 4)$ (b) $x = 6$

## 8.3 Common Factors

1. (a) $2(x + 2)$ (b) $5(x + 3)$ (c) $6(x + 3)$
   (d) $5(x - 5)$ (e) $3(x - 7)$ (f) $7(x + 5)$
   (g) $3(3x - 4)$ (h) $5(3x + 4)$ (i) $3(14x + 5)$

2. (a) $x(3x + 2)$ (b) $5(x^2 + 2)$ (c) $3x(2 - x)$
   (d) $2x(3x - 2)$ (e) $7x(3x + 2)$ (f) $5x(3 - 5x)$

3. (a) Yes (b) by 'taking out' a 2, giving $4x + 6x^2 = 2x(2 + 3x)$

4. (a) Yes (b) No ; $3x(x + 3)$ (c) No; $5x(1 - 6x)$
   (d) No; $8x(x - 4)$ (e) No; $6x(x - 3)$ (f) No; $3x(5 - 2x)$

# 8.3 Answers

5. The '3' has not been 'taken out' of the 24. Factorisation should be $3x(5+8x)$.

6. (a) $x(y+z)$ (b) $yz(x+3)$ (c) $4q(p-2r)$
   (d) $5xy(z+4u)$ (e) $y(5x-4p)$ (f) $x(7y+12z)$

7. (a) $xy(x+y)$ (b) $3xy^2(x+2)$ (c) $5xy(x-7)$
   (d) $2xy(11+2y)$ (e) $xyz(x+y)$ (f) $x^2(y-xz)$
   (g) $xy^2(x^5+y)$ (h) $x^2y^3(x^2+y^3)$

8. (a) $x^2+xy+xz$ (b) $x(5x+2y+4z)$

9. (a) $3(x+3y+6z)$ (b) $2x(2x+1+4y)$ (c) $3x(2-y+4z)$
   (d) $5x(z+4-7y)$ (e) $7x(x+2y-3y^2)$ (f) $x(4+6z+15y)$

10. (a) $x^2(4y+12xy^2+1)$ (b) $x^4y(6x^3y-4x-y)$
    (c) $xy(3xy-4y^2+x^3)$ (d) $x^2(5x^5y-y^3+4xz)$

## 8.4 Expansion of Two Brackets

1. (a)

| × | $x$ | 5 |
|---|---|---|
| $x$ | $x^2$ | $5x$ |
| 4 | $4x$ | 20 |

$(x+4)(x+5)$
$= x^2+9x+20$

| × | $x$ | $-7$ |
|---|---|---|
| $x$ | $x^2$ | $-7x$ |
| 4 | $4x$ | $-28$ |

$(x+4)(x-7)$
$= x^2-3x-28$

| × | $x$ | 4 |
|---|---|---|
| $x$ | $x^2$ | $4x$ |
| $-1$ | $-x$ | $-4$ |

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

| × | $x$ | $-5$ |
|---|---|---|
| $x$ | $x^2$ | $-5x$ |
| $-2$ | $-2x$ | 10 |

$(x-5)(x-2)$
$= x^2-7x+10$

2. (a) $x^2+7x+12$ (b) $x^2+3x-10$ (c) $x^2-6x+5$
   (d) $x^2+4x-21$ (e) $x^2-x-6$ (f) $x^2+3x-4$

3. (a) $x^2-1$ (b) $x^2-4$ (c) $x^2-25$ (d) $x^2-49$; no $x$ terms.

# 8.4 Answers

4. $(x+5)^2 = (x+5)(x+5) = x^2 + 10x + 25$; statement has no $x$ terms.

5. (a) $x^2 + 2x + 1$ (b) $x^2 - 2x + 1$ (c) $x^2 + 6x + 9$ (d) $x^2 - 10x + 25$

6. (a)

| $\times$ | $x$ | 6 |
|---|---|---|
| $2x$ | $2x^2$ | $12x$ |
| 1 | $x$ | 6 |

(b) $2x^2 + 13x + 6$

7. (a) $4x^2 + 10x + 4$ (b) $12x^2 + 7x + 1$ (c) $6x^2 + x + 4$
(d) $20x^2 - x - 1$ (e) $4x^2 + 4x + 1$ (f) $16x^2 - 24x + 9$

8. (a) $13x$ (b) $12x$ (c) $-7x$
(d) $-1$ (e) $2x^2$ (f) $-14x$

9. $(x+4)(x-5) = x^2 - x - 20$; no $x$ terms in original statement.

10. (a) 2 (b) 6 (c) 3, 9 (d) 7, 35
(e) 2, 2 (f) 4, 2 or 2, 4

11. (a) $x^4 + 4x^3 + 6x^2 + 4x + 1$ (b) $x^5 + 5x^4 + 10x^3 + 10x^2 + 5x + 1$

Coefficients are the numbers in the 2nd, 3rd, 4th and 5th rows of Pascal's Triangle for $(x+1)^2$, $(x+1)^3$, $(x+1)^4$ and $(x+1)^5$ respectively.