Expanding Brackets - Lesson 4

Expanding Brackets (All Types)

LI

- Expand brackets and simplify.
- Expand brackets of the form $(x + a)(x + b)$.
- Expand brackets of the form $(ax + b)(cx^2 + dx + e)$.

SC

- Collect like terms together.

Reminders

$$2 \times x = 2x$$

$$x \times x = x^2$$

$$x \times x^2 = x^3$$

$$+ve \times +ve = +ve$$

$$+ve \times -ve = -ve$$

$$-ve \times -ve = +ve$$

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Example 1

Expand the brackets and simplify fully :

$$2(3x + 2y) + 4(6x + 7y)$$

$$= 6x + 4y + 24x + 28y$$

$$= \boxed{30x + 32y}$$

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Example 2

Expand the brackets and simplify fully :

$$7w - 4(w - 6)$$

$$= 7w - 4w + 24$$

$$= \boxed{3w + 24}$$

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Example 3

Expand $(x + 4)(x - 5)$

FOIL

$$(x + 4)(x - 5)$$

$$= x^2 - 5x + 4x - 20$$

$$= \boxed{x^2 - x - 20}$$

Example 4

Expand $(Q - 9)(Q - 7)$

FOIL

$$(Q - 9)(Q - 7)$$

$$= Q^2 - 7Q - 9Q + 63$$

$$= \boxed{Q^2 - 16Q + 63}$$

Example 5

Expand $(x + 4)(x^2 - 5x + 3)$.

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

$$= x^3 \left| \begin{array}{l} - 5x^2 \\ + 4x^2 \end{array} \right| \begin{array}{l} + 3x \\ - 20x \end{array} \left| \begin{array}{l} \\ + 12 \end{array} \right.$$

$$= \boxed{x^3 - x^2 - 17x + 12}$$

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Example 6

Expand $(x - 3)(2x^2 + 4x - 7)$.

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

$$= 2x^3 \left| + 4x^2 \right| - 7x$$

$$\left| - 6x^2 \right| - 12x \left| + 21 \right.$$

$$= \boxed{2x^3 - 2x^2 - 19x + 21}$$

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- pg. 29-30 Ex. 3B Q 1 - 4.
- pg. 32 Ex. 3C Q 1 - 3.
- pg. 33 Ex. 3D Q 1 - 3.

1 Expand.

a $2(t + 4)$ **b** $5(m - 3)$ **c** $-6(2a + 1)$ **d** $-10(11 - 9y)$

e $8(2t + 3y + 1)$ **f** $-5(-4m + 2n - 7r)$ **g** $a(4 + c)$ **h** $2a(8 - c)$

i $5x(3y - 4)$ **j** $y(y - 4)$ **k** $-b(b - c)$ **l** $a(b - c + a)$

2 Expand and simplify.

a $3(2x + 7) - 12$ **b** $10(3y - 7) + 8y$ **c** $6 + 3(2 + y)$ **d** $12 + 4(2t - 3)$

e $8p - 5(4 - p)$ **f** $7 + 6(-3 + 2y)$ **g** $7 - (2p + 3)$ **h** $2t - (9 + 2t)$

3 Expand.

a $5x(2x + 3)$ **b** $3y(4y - 5)$ **c** $6t(-5t + 1)$ **d** $-4c(2c - 7)$

e $9m(5m + 4)$ **f** $8w(2m - 3w)$ **g** $x(-x + 7y)$ **h** $-9s(-4u + 3s)$

4 Expand and simplify.

a $5x^2 + 3x(x + 2)$ **b** $2y - y(5y - 4)$ **c** $8 - 5x(2x + 3)$

d $11t^2 - t(t + 3)$ **e** $4x(x + 7) + 3(2x - 1)$ **f** $6w(2w + 1) - 4w(w + 1)$

1 Expand and simplify.

a $(x + 3)(x + 2)$ **b** $(y + 7)(y + 4)$ **c** $(t + 4)(t + 8)$

d $(a - 7)(a - 3)$ **e** $(w - 2)(w - 9)$ **f** $(z - 10)(z - 8)$

g $(r - 3)(r + 10)$ **h** $(t + 11)(t - 4)$ **i** $(a - 9)(a + 7)$

2 Expand and simplify.

a $(2x + 1)(x - 3)$ **b** $(5y + 7)(3y - 4)$ **c** $(8u - 3)(u + 6)$

d $(7a - 2)(a + 5)$ **e** $(6t - 5)(3t - 2)$ **f** $(b - 8)(8b - 3)$

g $(7 + 3w)(2w - 5)$ **h** $(4 + 3s)(6 - 7s)$ **i** $(3m - 2)(4 + m)$

3 Expand and simplify.

a $(x + 5)^2$ **b** $(t - 2)^2$ **c** $(4a - 3)^2$

d $(3x + 1)^2$ **e** $(x + 2)^2 + (x + 6)^2$ **f** $(y + 8)^2 - (y - 3)^2$

g $(x^2 + 7)^2$ **h** $(t^2 - 4)^2$ **i** $(a^2 + 9)^2 + (7 - a)^2$

1 Expand and simplify.

a $(x + 1)(3x^2 + 2x + 7)$ **b** $(y + 4)(2y^2 - 5y + 2)$ **c** $(x + 3)(5x^2 - x - 1)$

d $(t - 2)(3t^2 + 6t - 1)$ **e** $(w - 5)(w^2 - 4w - 2)$ **f** $(5 + a)(4a^2 - 2a + 5)$

2 Expand and simplify.

a $(3x - 2)(4x^2 + 3x + 1)$ **b** $(6y + 1)(2y^2 - 3y - 2)$ **c** $(7a + 4)(2a^2 - 5a + 3)$

d $(4w - 5)(w^2 - 3w + 4)$ **e** $(8b - 7)(2b^2 + 7b + 9)$ **f** $(6x^2 + 2x - 3)(5x - 1)$

3 Expand and simplify.

a $(x + 7)(2x^2 + 9x + 5)$ **b** $(a - 2)(3a^2 - 7a + 4)$ **c** $(6 - a)(5a^2 + 6a - 1)$

d $(9u + 5)(3u^2 - 8u + 7)$ **e** $(b + 5)(6b^2 - 2b + 5)$ **f** $(4w^2 - 5w + 3)(8w - 1)$

Answers

1	a	$2t + 8$	2	a	$6x + 9$	3	a	$10x^2 + 15x$	4	a	$8x^2 + 6x$
	b	$5m - 15$		b	$38y - 70$		b	$12y^2 - 15y$		b	$6y - 5y^2$
	c	$-12a - 6$		c	$12 + 3y$		c	$-30t^2 + 6t$		c	$8 - 10x^2 - 15x$
	d	$90y - 110$		d	$8t$		d	$-8c^2 + 28c$		d	$10t^2 - 3t$
	e	$16t + 24y + 8$		e	$13p - 20$		e	$45m^2 + 36m$		e	$4x^2 + 34x - 3$
	f	$20m - 10n + 35r$		f	$12y - 11$		f	$16mw - 24w^2$		f	$8w^2 + 2w$
	g	$4a + ac$		g	$4 - 2p$		g	$-x^2 + 7xy$			
	h	$16a - 2ac$		h	-9		h	$36su - 27s^2$			
	i	$15xy - 20x$									
	j	$y^2 - 4y$									
	k	$-b^2 + bc$									
	l	$ab - ac + a^2$									

Answers

1	**a**	$x^2 + 5x + 6$	**2**	**a**	$2x^2 - 5x - 3$	**3**	**a**	$x^2 + 10x + 25$
	b	$y^2 + 11y + 28$		**b**	$15y^2 + y - 28$		**b**	$t^2 - 4t + 4$
	c	$t^2 + 12t + 32$		**c**	$8u^2 + 45u - 18$		**c**	$16a^2 - 24a + 9$
	d	$a^2 - 10a + 21$		**d**	$7a^2 + 33a - 10$		**d**	$9x^2 + 6x + 1$
	e	$w^2 - 11w + 18$		**e**	$18t^2 - 27t + 10$		**e**	$2x^2 + 16x + 40$
	f	$z^2 - 18z + 80$		**f**	$8b^2 - 67b + 24$		**f**	$22y + 55$
	g	$r^2 + 7r - 30$		**g**	$6w^2 - w - 35$		**g**	$x^4 + 14x^2 + 49$
	h	$t^2 + 7t - 44$		**h**	$24 - 10s - 21s^2$		**h**	$t^4 - 8t^2 + 16$
	i	$a^2 - 2a - 63$		**i**	$10m + 3m^2 - 8$		**i**	$a^4 + 19a^2 - 14a + 130$

Answers

1	**a**	$3x^3 + 5x^2 + 9x + 7$	**2**	**a**	$12x^3 + x^2 - 3x - 2$	**3**	**a**	$2x^3 + 23x^2 + 68x + 35$
	b	$2y^3 + 3y^2 - 18y + 8$		**b**	$12y^3 - 16y^2 - 15y - 2$		**b**	$3a^3 - 13a^2 + 18a - 8$
	c	$5x^3 + 14x^2 - 4x - 3$		**c**	$14a^3 - 27a^2 + a + 12$		**c**	$-5a^3 + 24a^2 + 37a - 6$
	d	$3t^3 - 13t + 2$		**d**	$4w^3 - 17w^2 + 31w - 20$		**d**	$27u^3 - 57u^2 + 23u + 35$
	e	$w^3 - 9w^2 + 18w + 10$		**e**	$16b^3 + 42b^2 + 23b - 63$		**e**	$6b^3 + 28b^2 - 5b + 25$
	f	$4a^3 + 18a^2 - 5a + 25$		**f**	$30x^3 + 4x^2 - 17x + 3$		**f**	$32w^3 - 44w^2 + 29w - 3$