Expanding Brackets - Lesson 3

Expanding a Binomial with a Quadratic Trinomial

LI

- Expand brackets of the form $(a x + b)(c x^2 + d x + e)$.

SC

- Collect like terms together.

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Reminders

$$2 \times x = 2x$$

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

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

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

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

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

Jun 9-14:36

Example 1

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

Method 1 (Standard)

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

$$= x^3 \left| - 5x^2 \right| + 3x$$
$$\quad + 4x^2 \left| - 20x \right| + 12$$

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

Method 2 (Grid)

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

	x^2	$-5x$	$+3$
x	x^3	$-5x^2$	$+3x$
$+4$	$+4x^2$	$-20x$	$+12$

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Example 2

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

Method 1 (Standard)

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

$$= 2x^3 \left| + 4x^2 \right| - 7x \left| \right.$$
$$\left| - 6x^2 \right| - 12x \left| + 21 \right.$$

$$= 2x^3 - 2x^2 - 19x + 21$$

Method 2 (Grid)

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

	$2x^2$	$+ 4x$	$- 7$
x	$2x^3$	$+ 4x^2$	$- 7x$
$- 3$	$- 6x^2$	$- 12x$	$+ 21$

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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** $(4w^2-5w+3)(8w-1)$

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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	$32w^3 - 44w^2 + 29w - 3$