

Boost Free Lessons - Year 9 Maths

Lesson 5: Expanding Binomial Products

Name: _____ Grade: _____ Date: _____

Worked Example 1

Expand $(x + 3)(x + 5)$

	x	$+ 5$
x	x^2	$5x$
$+ 3$	$3x$	15

1. Every term in the first bracket multiplies every term in the second, giving four products.
2. First: $x \times x = x^2$. Outer: $x \times 5 = 5x$.
3. Inner: $3 \times x = 3x$. Last: $3 \times 5 = 15$.
4. Write them all out: $x^2 + 5x + 3x + 15$, then collect the two middle terms.

$$= x^2 + 8x + 15$$

Worked Example 2

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

1. First: $2x \times x = 2x^2$. Outer: $2x \times 4 = 8x$.
2. Inner: $-3 \times x = -3x$. Last: $-3 \times 4 = -12$.
3. Keep the signs with their terms: $2x^2 + 8x - 3x - 12$.
4. Collect the middle terms: $8x - 3x = 5x$.

$$= 2x^2 + 5x - 12$$

Remember: Four products every time, then collect the two middle terms. When a bracket is squared, write it out as two brackets first, because $(x + 5)^2$ is **not** $x^2 + 25$.



Question 1: Expand and simplify the following.

1. $(x + 1)(x + 2)$

2. $(x + 4)(x + 3)$

3. $(x + 6)(x - 2)$

4. $(x - 5)(x + 3)$

5. $(x - 2)(x - 7)$

6. $(x + 8)(x - 8)$

7. $(x + 5)^2$

8. $(x - 3)^2$

9. $(x + 9)(x + 1)$

10. $(x - 6)(x - 4)$



Question 2: Expand and simplify the following.

1. $(2x + 1)(x + 3)$

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

3. $(x + 2)(4x - 1)$

4. $(2x - 3)(3x + 1)$

5. $(5x + 2)(x - 4)$

6. $(3x + 4)(3x - 4)$

7. $(2x + 5)^2$

8. $(4x - 1)(2x + 3)$



Question 3: Answer the following questions.

1. A rectangle has length $(x + 7)$ and width $(x + 2)$. Write an expression for its area and expand it.
2. Expand and simplify $(x + 4)^2 - (x + 1)^2$.
3. A square has side $(x - 3)$. Write an expression for its area and expand it.
4. Expand and simplify $(x + 5)(x - 5) + 25$.
5. Expand $(2x + 3)(x + 1)$, then find its value when $x = 2$.





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Answers: Expanding Binomial Products**Question 1**

1. $x^2 + 3x + 2$
2. $x^2 + 7x + 12$
3. $x^2 + 4x - 12$
4. $x^2 - 2x - 15$
5. $x^2 - 9x + 14$
6. $x^2 - 64$
7. $x^2 + 10x + 25$
8. $x^2 - 6x + 9$
9. $x^2 + 10x + 9$
10. $x^2 - 10x + 24$

Question 2

1. $2x^2 + 7x + 3$
2. $3x^2 + 13x - 10$
3. $4x^2 + 7x - 2$
4. $6x^2 - 7x - 3$
5. $5x^2 - 18x - 8$
6. $9x^2 - 16$
7. $4x^2 + 20x + 25$
8. $8x^2 + 10x - 3$

Question 3

1. $x^2 + 9x + 14$
2. $6x + 15$
3. $x^2 - 6x + 9$
4. x^2
5. $2x^2 + 5x + 3$, and when $x = 2$ the value is 21

