# Year 9 expanding brackets worksheet

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Name: _____ Date: _____

**Question 1**

Expand and simplify:

(a) -2x(3x - 5)

(b) 4(2a - 3) - 5(a - 2)

Answer: _____

**Question 2**

Expand and simplify (x + 5)(x - 3).

Answer: _____

**Question 3**

Expand $(x + 7)^2$.

Answer: _____

**Question 4**

Rectangle A measures 3x cm by (x + 2) cm. Rectangle B measures x cm by (2x - 5) cm, where x > 2.5.

(a) Write an expanded expression for the area of each rectangle.

(b) Find a simplified expression for the total area of the two rectangles.

(c) Find a simplified expression for how much larger the area of A is than the area of B.

(d) Use your answer to (b) to find the total area when x = 4.

Answer: _____

**Question 5**

A rectangular garden has a length of (x + 7) metres and a width of (x - 2) metres. A gardener expands the expression for the area and finds it equals $x^2 + bx - 14$. Find the value of b. Then, a second rectangular garden has area $x^2 + 3x - 10$ square metres. Write the dimensions of the second garden as two binomial expressions.

Answer: _____

**Question 6**

Expand $(3a - 4)^2$.

Answer: _____

**Question 7**

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

Answer: _____

**Question 8**

Expand and simplify $(3x - 2)(x + 5)$.

Answer: _____

**Question 9**

Expand $(5m + 2)(5m - 2)$.

Answer: _____

**Question 10**

Expand $-5a(2a - 3)$.

Answer: _____

# Year 9 expanding brackets: answers and worked solutions

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**Question 1**

**Key idea:** Multiply every term inside the brackets by the term outside, taking care with negative signs, then collect like terms.

1. (a) $-2x \times 3x = -6x^2$ and $-2x \times (-5) = 10x$, so $-6x^2 + 10x$ 2. (b) $4(2a - 3) = 8a - 12$ and $-5(a - 2) = -5a + 10$ 3. (b) $8a - 12 - 5a + 10 = 3a - 2$

**Answer:** (a) $-6x^2 + 10x$ (b) $3a - 2$

**Question 2**

**Key idea:** Use the distributive law (FOIL) to multiply every term in the first bracket by every term in the second bracket, then collect like terms.

1. Multiply the First terms: $x \times x = x^2$ 2. Multiply the Outer terms: $x \times (-3) = -3x$ 3. Multiply the Inner terms: $5 \times x = 5x$ 4. Multiply the Last terms: $5 \times (-3) = -15$ 5. Collect like terms: $x^2 - 3x + 5x - 15 = x^2 + 2x - 15$

**Answer:** $x^2 + 2x - 15$

**Question 3**

**Key idea:** $(a + b)^2 = a^2 + 2ab + b^2$.

1. $x^2 + 2 \times x \times 7 + 7^2$ 2. $= x^2 + 14x + 49$

**Answer:** $x^2 + 14x + 49$

**Question 4**

**Key idea:** Area of a rectangle = length × width. Expand each product, then add or subtract like terms.

1. (a) A: $3x(x + 2) = 3x^2 + 6x$; B: $x(2x - 5) = 2x^2 - 5x$ 2. (b) $(3x^2 + 6x) + (2x^2 - 5x) = 5x^2 + x$ 3. (c) $(3x^2 + 6x) - (2x^2 - 5x) = 3x^2 + 6x - 2x^2 + 5x = x^2 + 11x$ 4. (d) $5(4)^2 + 4 = 80 + 4 = 84$ (check: A = $12 \times 6 = 72$, B = $4 \times 3 = 12$, total 84)

**Answer:** (a) A: $(3x^2 + 6x)$ cm²; B: $(2x^2 - 5x)$ cm² (b) $(5x^2 + x)$ cm² (c) $(x^2 + 11x)$ cm² (d) 84 cm²

**Question 5**

**Key idea:** Area of a rectangle equals length times width. Expand the binomial product to find b, then factorise the second quadratic to find the dimensions of the second garden.

1. Expand $(x + 7)(x - 2)$ using the distributive law:\ $(x + 7)(x - 2) = x^2 - 2x + 7x - 14 = x^2 + 5x - 14$ 2. Comparing with $x^2 + bx - 14$: $b = 5$. 3. Factorise $x^2 + 3x - 10$: find two numbers that multiply to -10 and add to 3. 4. $5 \times (-2) = -10$ and $5 + (-2) = 3$ ✓ 5. So $x^2 + 3x - 10 = (x + 5)(x - 2)$, meaning the second garden has dimensions $(x + 5)$ metres and $(x - 2)$ metres.

**Answer:** $b = 5$; dimensions of the second garden are $(x + 5)$ metres and $(x - 2)$ metres.

**Question 6**

**Key idea:** $(a - b)^2 = a^2 - 2ab + b^2$.

1. $(3a)^2 - 2 \times 3a \times 4 + 4^2$ 2. $= 9a^2 - 24a + 16$

**Answer:** $9a^2 - 24a + 16$

**Question 7**

**Key idea:** Expand each bracket, taking care with the negative sign, then collect like terms.

1. $3(2x + 5) = 6x + 15$ 2. $-2(x - 4) = -2x + 8$ 3. $6x + 15 - 2x + 8 = 4x + 23$

**Answer:** $4x + 23$

**Question 8**

**Key idea:** Multiply each term in the first bracket by each term in the second bracket.

1. $3x \times x + 3x \times 5 - 2 \times x - 2 \times 5$ 2. $= 3x^2 + 15x - 2x - 10 = 3x^2 + 13x - 10$

**Answer:** $3x^2 + 13x - 10$

**Question 9**

**Key idea:** $(a + b)(a - b) = a^2 - b^2$.

1. $(5m)^2 - 2^2$ 2. $= 25m^2 - 4$

**Answer:** $25m^2 - 4$

**Question 10**

**Key idea:** Multiply each term inside the bracket by $-5a$.

1. $-5a \times 2a = -10a^2$ 2. $-5a \times (-3) = 15a$

**Answer:** $-10a^2 + 15a$