



STUDY PLUS
A BRIGHTER FUTURE

YEAR 8 ALGEBRA

WORKBOOK 15

Name:

Year Group:

Start Date:

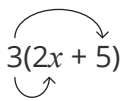
Expanding Single Brackets

REVISION OF RULES

When you **expand** a bracket, you are removing a set of brackets from an expression. To do this, you multiply the term outside the bracket by **each separate term** inside the bracket.

Example 1

Here, we need to multiply both terms inside the bracket by 3. Sometimes, it helps to draw lines to represent each multiplication, so you don't forget one:


$$3(2x + 5)$$

$$3 \times 2x = 6x$$

$$3 \times 5 = 15$$

We combine these into a single expression for our answer:

$$6x + 15$$

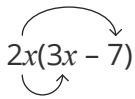
The terms can be written in any order ($15 + 6x$ is also correct) but, generally, we write them in decreasing powers of x .

Example 2

Expand the following bracket:

$$2x(3x - 7)$$

In this example, we follow the same process, but our multiplications will be a little trickier:


$$2x(3x - 7)$$

First, we need to multiply $2x$ by $3x$. You can do this in two stages, multiply 2 by 3 to get 6, then multiply x by x to get x^2 :

$$2x \times 3x = 6x^2$$

Secondly, we need to multiply $2x$ by -7 . Here, you need to take note of the sign:

$$2x \times -7 = -14x$$

This gives us a final answer of:

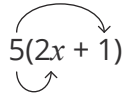
$$6x^2 - 14x$$

Example 3 Expand

and simplify:

$$5(2x + 1) - 3(3x - 2)$$

Sometimes, you'll be asked to expand and simplify two brackets. This means you expand both brackets individually, then simplify the answer. For the first bracket:

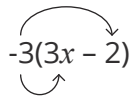

$$5(2x + 1)$$

$$5 \times 2x = 10x$$

$$5 \times 1 = 5$$

$$5(2x + 1) = 10x + 5$$

For the second bracket, be careful with the signs. We're multiplying by -3, not by 3:


$$-3(3x - 2)$$

$$-3 \times 3x = -9x$$

$$-3 \times -2 = 6$$

$$-3(3x - 2) = -9x + 6$$

Now, we'll bring the expanded brackets together:

$$10x + 5 - 9x + 6$$

Collect the x terms:

$$10x - 9x = x$$

Collect the numbers:

$$5 + 6 = 11$$

Finally, combine these for our answer:

$$5(2x + 1) - 3(3x - 2) = x + 11$$

Your Turn

1. Expand the following brackets.

a. $2(x + 5)$

d. $10(t - 2)$

g. $x(x - 2)$

j. $10m(2m + 7)$

b. $3(x + 6)$

e. $7(2 - x)$

h. $a(a - 4)$

k. $-4(3y - 2)$

c. $5(y + 7)$

f. $4(8 - x)$

i. $r(2r + 3)$

l. $-2(4 - 2g)$

2. **Expand and fully simplify:**

a. $9(x + 2) + 4(x + 3)$

f. $-4(y + 3) - 3(y - 5)$

b. $2(x + 3) + 2(x + 8)$

g. $10x(x + 2) + x(x + 6)$

c. $3(z - 6) + 4(z + 4)$

h. $3a(a - 4) - 2a(a - 2)$

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

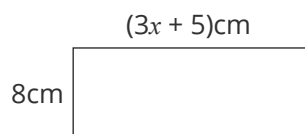
i. $2y(y + 7) + y(y + 3) + 4(y + 5)$

e. $6(p + 5) - 2(p - 2)$

j. $4b(2 - b) - b(3b + 2) + 6(b - 5)$

Challenge

Write an expression to find the area of this rectangle. Expand and simplify the expression.





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