

Expanding Single Brackets

A lot of the time you will be asked to **expand** a bracket. This means you need to **multiply** the term on the **outside** of the bracket with **each separate term** inside the bracket.

For example:

Expand the following bracket:

$$3(2x + 5)$$

Some remember the steps by saying 'under the bridge' and 'over the rainbow':

$$3(2x + 5)$$

$$\text{'Under the bridge'} = 3 \times 2x = 6x$$

$$3(2x + 5)$$

'Over the rainbow' = $3 \times (+5) = +15$ (Make sure you take note of the sign which is in front of the second term in the bracket).

Now, place the terms next to each other. Terms can be written in any order but, generally, we do this in decreasing powers of x , so the answer here is $6x + 15$.

Things might get a little trickier:

Expand and fully simplify the following:

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

Step 1. Expand each bracket separately:

$$x(2x + 1) = 2x^2 + x$$

When expanding the second bracket, multiply each term inside the bracket by the negative term ($-x$). The second term inside the bracket is negative so be careful!

$$\text{Here, you have } -x \times 4x = -4x^2 \text{ and } -x \times -2 = +2x$$

Step 2. Group together like terms and simplify:

$$\begin{aligned} & 2x^2 + x - 4x^2 + 2x \\ &= -2x^2 + 3x \end{aligned}$$



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.


