



Expanding and Simplifying Single Brackets

Physical and Pictorial Stage

Example

By drawing a diagram, work out the total of $2(x+1)$ and $3(x-4)$

x	1
x	1

x	-1	-1	-1	-1
x	-1	-1	-1	-1
x	-1	-1	-1	-1

Draw the diagram to represent each expression.

Cross out any zero-pairs.

There are 5x's and a total of -10 ones.

Identify the remaining tiles.

The total is **$5x - 10$** .

1 By drawing a diagram, work out the **total** of the two expressions in each part below:

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

b) $3(x+1)$ and $2(x-4)$

c) $3(x-1)$ and $2(x-4)$

d) $3(x-1)$ and $2(x-3)$

e) $4(x+1)$ and $2(x-3)$

f) $4(x-1)$ and $2(x-3)$

2 Using your answers to question 1, expand and simplify:

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

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

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

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

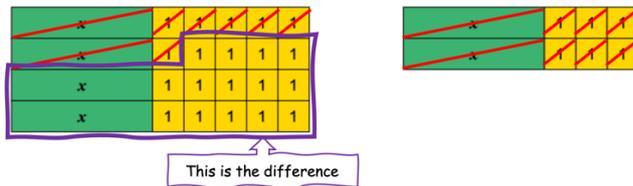
e) $4(x+1) + 2(x-3)$

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

3 Aaron and Bella are trying to find the difference between $4(x+5)$ and $2(x+3)$. Here are Aaron and Bella's methods.

Aaron says:

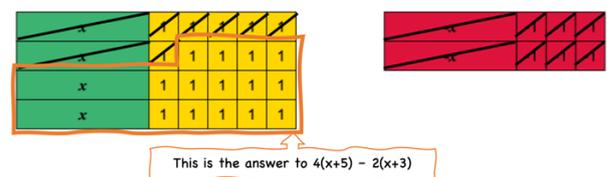
"Because we are trying to find the difference, if I remove the same tiles from both diagrams I will get the difference."



So the difference between $4(x+5)$ and $2(x+3)$ is $2x+14$

Bella says:

"The difference is calculated by working out $4(x+5) - 2(x+3)$. To do this I need to subtract 2 lots of x , and 2 lots of 3, this is the same as subtracting $2x$ and subtracting 6."



So $4(x+5) - 2(x+3) = \underline{2x+14}$

What do you notice about the two methods? Who's method is better? Why?

- 4 Charlie, Danni and Erin are using a grid to expand and simplify $4(x+5) - 2(x+3)$.

Their methods are shown below:

Charlie:

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

X	x	+5	
4	4x	+20	

$$= 4x + 20 - 2x + 6$$

$$= \underline{2x + 26}$$

Danni:

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

X	x	+5	
4	4x	+20	

$$= 4x + 20 - 2x - 6$$

$$= \underline{2x + 14}$$

- a) Danni got the correct answer, Charlie has made a mistake. Identify where Charlie has made a mistake.

- b) Danni's has started to expand and simplify $6(x+3) - 4(x+7)$, finish off her working and find the final answer.

$$6(x+3) - 4(x+7)$$

X	x	+3	
6	6x		

X	x	+7	

$$= \square x + \square - \square x - \square$$

$$= \square x - \square$$

- c) The next question Danni is going to try is:

$$\text{Expand and simplify } 6(x-3) - 4(x-7)$$

What are the differences between this question and the question in part b)? How will this affect the final answer?

- d) Work out the answer to $6(x-3) - 4(x-7)$ using the same Grid Method Danni uses.

5 Expand and simplify the following:

a) $5(x+1) + 7(x+3)$

b) $5(x+1) + 8(x+3)$

c) $6(x+1) + 8(x+3)$

d) $3(2x+1) + 4(2x+3)$

e) $4(2x+1) + 3(2x+3)$

f) $4(2x+3) + 3(2x+1)$

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

h) $4(5x+3) - 3(2x+1)$

i) $4(5x-3) - 3(2x+1)$

j) $4(5x-3) - 3(2x-1)$