EXPANDING BRACKETS

Consider
$$2(3+4)$$

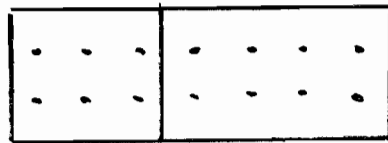This means 2 multiplied by the value of the bracket

so $2 \times 7 = 14$

We can think of this as 2 rows of 7 dots

. . . .
. . . .

But we can also think of it as

$$2 \times 3 + 2 \times 4$$
$$= \quad 6 \quad + \quad 8 \quad = 14 \quad \text{as before!}$$

Therefore $\quad 2(3+4)$
$$= 2 \times 3 + 2 \times 4$$
$$= \quad 6 \quad + \quad 8 \quad = 14$$

Basically, the 2 is multiplied by every term in the bracket.

This is particularly useful in algebra

Examples

1. $\qquad 2(x+y) = 2x + 2y$

2. $\qquad 3(x+4) = 3x + 12$

EXPANDING BRACKETS

Common WRONG ANSWERS

$$3(x+4) = 3x+4 \quad ✗$$

$$3(x+4) = 3x+7 \quad ✗$$

The right answer

$$3(x+4) = 3x+12 \quad ✓$$

Rules for multiplying signed numbers

$$+ \times + \rightarrow +$$

$$- \times - \rightarrow +$$

$$+ \times - \rightarrow -$$

$$- \times + \rightarrow -$$

So 2 signs the same multiply to a $+$

and 2 different signs multiply to a $-$

Examples

1 $\quad 4(y+2) = 4y+8$

2 $\quad 5(2x+3) = 10x+15$

3 $\quad 3(x-4) = 3x-12$

4 $\quad 2(3x+y) = 6x+2y$

5 $\quad 5(2p-1) = 10p-5$

6 $\quad 6(x-3) = 6x-18$

7 $\quad 3(2p-q) = 6p-3q$

8 $\quad 5(x+y+2) = 5x+5y+10$

EXPANDING BRACKETS

$$9 \qquad -2(x+3) \;=\; -2x-6$$

$$10 \qquad -4(p-q) \;=\; -4p+4q$$

$$11 \qquad -3(2m-n) \;=\; -6m+3n$$

$$12 \qquad -2(x-y+4) \;=\; -2x+2y-8$$

Expanding brackets and simplifying

Examples

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

$= 2x+6+3x+15$

$= 5x+21$

2) $5(p+2q)+2(p+q)$

$= 5p+10q+2p+2q$

$= 7p+12q$

3) $2(y-3)+4(y+2)$

$= 2y-6+4y+8$

$= 6y+2$

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

$= 3x+15-2x-2$

$= x+13$

5) $5(2x+y)-2(x-y)$

$= 10x+5y-2x+2y$

$= 8x+7y$

6) $3(p+2q)-(p+q)$

$= 3p+6q-p-q$

$= 2p+5q$