



### single brackets...

The word **expand** means to 'get rid of' any brackets, by multiplying.

**EXAMPLE:**

Expand  $5(4m + 3)$

	$4m$	$+3$
$5$	$20m$	$15$

$= 20m + 15$

*Draw a grid and put the terms from the question around the outside*

*Then fill in the middle, by multiplying*

**EXAMPLE:**

Expand  $h(h - 2)$

	$h$	$-2$
$h$	$h^2$	$-2h$

$= h^2 - 2h$

*The -2 in the bracket is negative*

*Remember to write the number first (not  $p^4$ )*

$6 - 2 = 4$ , so  
 $6m - 2m = 4m$

$9p + p = 10p$  &  
 $5d - 3d = 2d$   
Alternative answer:  $2d + 10p$

$6p^2 + p^2 = 7p^2$   
and  
 $3p - 5p = -2p$

$2 \times -3 = -6$   
and  $p \times p = p^2$

**EXAMPLE:**

Expand  $2p(5 - 3p)$

	$5$	$-3p$
$2p$	$10p$	$-6p^2$

$= 10p - 6p^2$

### like terms...

**like terms** have the same combination of letters and powers.

e.g.

$5m$  and  $2m$

$6h^2$  and  $-3h^2$

$17$  and  $0.8$

We can make an expression simpler by collecting together any like terms.

**EXAMPLE:** Simplify

(a)  $p + p + p + p$

$= 4p$

(b)  $6m - 2m$

$= 4m$

(c)  $9p + 5d + p - 3d$

$= 10p + 2d$

(d)  $6p^2 + 3p - 5p + p^2$

$= 7p^2 - 2p$

(e)  $4m^2 + 8m - 5 + 2m$

$= 4m^2 + 10m - 5$

*Only the  $8m$  &  $2m$  are like terms. The terms in the answer could be written in any order*

## double brackets...

**EXAMPLE:**

Expand and simplify  
 $(x + 4)(x + 2)$

	$x$	$+4$
$x$	$x^2$	$4x$
$+2$	$2x$	$8$

$$= x^2 + 4x + 2x + 8$$

$$= x^2 + 6x + 8$$

**EXAMPLE:**

Expand and simplify  
 $(2p + 3)(p - 5)$

	$2p$	$+3$
$p$	$2p^2$	$3p$
$-5$	$-10p$	$-15$

$$= 2p^2 + 3p - 10p - 15$$

$$= 2p^2 - 7p - 15$$

$3p - 10p$   
 simplifies to  $-7p$

One bracket goes  
 at the top and the  
 other bracket  
 down the side

Multiply four times  
 to complete the  
 grid

Start with the  
 'question' inside  
 the grid

Then decide  
 what goes into  
 $5x$  and  $10$

Finally, work out  
 what goes at the  
 top of the grid to  
 make  $5x$  and  $10$

$4x + 2x$   
 simplifies  
 to  $6x$

This time,  $p$  goes  
 into both

$-5 \times 3 = -15$   
 (positive  
 multiplied by  
 negative is  
 negative)

$2$  goes into  $6$  &  $8$   
 and  $m$  also goes  
 into both

## factorising...

**factorise** means  
 'put into brackets'.  
 Factorising is the  
 opposite of expanding.

**EXAMPLE:**

Factorise  $5x + 10$

	$x$	$2$
$5$	$5x$	$+10$

$$= 5(x + 2)$$

**EXAMPLE:**

Factorise  $p^2 - 6p$

	$p$	$-6$
$p$	$p^2$	$-6p$

$$= p(p - 6)$$

**EXAMPLE:**

Factorise  $6m + 8m^2$

	$3$	$4m$
$2m$	$6m$	$8m^2$

$$= 2m(3 + 4m)$$

This is factorised fully  
 because nothing still  
 goes into both terms in  
 the bracket