Expanding brackets

Expanding means to multiply each term in the bracket by the expression outside.

1) $3(m+7) = 3\times m + 3\times 7 = 3m + 21$

2) $(y+2)(y+3) = (y+2) \times (y+3)$

	y	$+3$
y	y^2	$3y$
$+2$	$2y$	6

$= y^2 + 3y + 2y + 6 = y^2 + 5y + 6$

3) $(y+1)(y-2)(y+3)$

	y	-2
y	y^2	$-2y$
$+1$	y	-2

$= y^2 + y - 2y - 2 = (y^2 - y - 2)(y+3)$

$y\times(y^2 - y - 2) + 3\times(y^2 - y - 2)$

$y^3 - y^2 - 2y + 3y^2 - 3y - 6$

$y^3 + 2y^2 - 5y - 6$

Factorising How?

Factorise the equation, set each bracket equal to 0 and solve individually.

When? The equation is too hard to factorise, or it can be factorised easily.

Example. $x^2 - 15x + 56 = 0$

$+-15$ ← $(x-7)(x-8) = 0$ → $\times 56$

$x = 8$ or 7

Algebra 2 (topic 13)

Quadratic formula $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

How? Label the numbers as a, b, c put into the formula and solve.

When? The question is too hard to factorise, or when it asks for you to give the answer as dp or sf.

Example. $1x^2 - 5x - 8 = 0$ to 2dp

$a = 1$, $b = -5$, $c = -8$

$$\frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)\times(-8)}}{2\times(1)}$$

$= 6.27$ or -1.27 (2dp)

Completing the Square

How? Half the coefficient (number before x) and fill in the bracket. Calculate what must be added or subtracted from this to make the original equation.

When? The question asks for the form $(x+a)^2 + b$

Example. $x^2 + 8x + 5 = 0$ in form $(x+a)^2 + b$

$(x+4)^2 + 5 - 16 = 0$

(minus the squared value)

$(x+4)^2 - 11 = 0$

$(x+4)^2 = 11$

$x + 4 = \pm\sqrt{11}$

$x = -4 \pm \sqrt{11}$

- ☐ Learn
- ☐ Practice
- ☐ Practice more
- ☐ Understand
- ☐ Test

Good Luck!!