Factorising Quadratic Expressions
Consider $(x+a)(x+b)$

$$
\begin{aligned}
& =x^{2}+a x+b x+a b \\
& =x^{2}=(a+b) x+a b
\end{aligned}
$$

Factorising is the opposite of this process

$$
\begin{aligned}
& x^{2}+5 x+6 \\
&=(x+2)(x+3) \\
&+1+6 \\
&-1-6 \\
&+2+3 \sqrt{2}-2
\end{aligned}
$$

The pair of numbers which go in the brackets have to multiply to give the number on the end "+6" and add together to give the number of $x s$ " +5 ".

Further examples
1)

$$
\begin{array}{lll}
x^{2}+6 x+8 & +1 & +8 \\
=(x+2)(x+4) & -1 & -8 \\
& +2 & +4 \\
-2 & -4
\end{array}
$$

2) 

$$
\begin{array}{lll}
x^{2}+11 x+24 & +1+24 \\
(x+3)(x+8) & -1 & -24 \\
& +2+12 \\
& -2-12 \\
& +3+8 \\
& -3-8 \\
& +4+6
\end{array}
$$

Exercise Factorise
1)

$$
\begin{aligned}
& x^{2}+6 x+5 \\
= & (x+1)(x+5)
\end{aligned} \quad-1+5 x
$$

2) 

$$
\begin{aligned}
& x^{2}+7 x+10
\end{aligned} \quad \begin{aligned}
& +1+10 \\
& = \\
& =(x+2)(x+5) \\
&
\end{aligned} \quad+2+5 x
$$

3) 

$$
\begin{aligned}
\text { 3) } & x^{2}+7 x+12 \\
= & (x+3)(x+4) \\
\text { 4) } & x^{2}+12 x+20 \\
= & (x+2)(x+10)
\end{aligned}
$$

$$
\begin{aligned}
& +1+12 \\
& -1 \\
& +12 \\
& +2+6 \\
& -2 \\
& +3 \\
& -6 \\
& -3
\end{aligned}-4
$$

$$
\begin{array}{ll}
+1 & +20 \\
-1 & -20 \\
+2 & +10
\end{array}
$$

5) 

$$
\begin{array}{ll}
x^{2}+15 x+14 & +1+142 \\
=(x+1)(x+14) & +1+14 \\
& +2+7
\end{array}
$$

6) 

$$
\begin{array}{ll}
x^{2}+10 x+21 & +1+21 \\
=(x+3)(x+7) & -1+21 \\
\hline+3+7
\end{array}
$$

7) 

$$
\begin{aligned}
& x^{2}+2 x+1 \\
= & (x+1)(x+1)
\end{aligned}
$$

