Foundation Tier

Factorise:

i) $x^2+5x-36$

ii) x^2-49

Solve:

i) $x^2+3x-18=0$

ii) $x^2+x-20=10$

Higher Tier

Solve: $x^2-2x-11=4$

By i) factorising

ii) using the quadratic formula

iii) completing the square

Challenge:

Solve $2x^2-5x-12=0$ by completing the square.

Answers:

Foundation:

Factorising: i) $(x-4)(x+0)$, ii) $(x-7)(x+7)$

Solving: i) $(x-3)(x+6)=0$

$x=3, x=-6$

ii) $x^2+x-30=0$

$(x+6)(x-5)=0$

$x=-6, x=5$

Remember:
When solving, the right-hand side must always be zero **before** any of the methods are used.

Higher:

i) Factorising. $x^2-2x-15=0$

$(x+3)(x-5)=0$

$x=-3, x=5$

ii) Quadratic formula: $x=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}$

$x=\dfrac{2\pm\sqrt{(-2)^2-4\times1\times-15}}{2\times1}$

$x=\dfrac{2\pm\sqrt{4+60}}{2}$

$x=\dfrac{2\pm8}{2}$

$x=5, x=-3$

iii) Completing the square:

$x^2-2x-15=0$

$(x-1)^2-1^2-15=0$

$(x-1)^2-16=0$

$(x-1)^2=16$

$x-1=\sqrt{16}$

$x-1=\pm4$

$x=1\pm4$

$x=5, x=-3$

Challenge

$2x^2-5x-12=0$

$x^2-\frac{5}{2}x-6=0$

$\left(x-\frac{5}{4}\right)^2-\left(\frac{5}{4}\right)^2-6=0$

$\left(x-\frac{5}{4}\right)^2-\frac{25}{16}-6=0$

$\left(x-\frac{5}{4}\right)^2-\frac{121}{16}=0$

$\left(x-\frac{5}{4}\right)^2=\frac{121}{16}$

$x-\frac{5}{4}=\sqrt{\frac{121}{16}}$

$x-\frac{5}{4}=\pm\frac{11}{4}$

$x=\frac{5}{4}\pm\frac{11}{4}$

$x=4, x=-\frac{3}{2}$