YOU & MATHS **Factoring fun** Factor these polynomials.

a. $-18x^2-65x-7$ **c.** $-18x^2+61x+7$

b. $25-4x^2$ **d.** $18x^3-61x^2-7x$

a. You can use the quadratic formula to find roots of the equation

$$-18x^2-65x-7=0,$$

which is $18x^2+65x+7=0$. You get:

$$x=\frac{-65\pm\sqrt{65^2-4\cdot 18\cdot 7}}{36}=\frac{-65\pm\sqrt{3721}}{36}=\frac{-65\pm 61}{36}.$$

So the roots are $-\frac{1}{9}$ and $-\frac{7}{2}$. So the polynomial can be factored as: $-\left(x+\frac{1}{9}\right)\left(x+\frac{7}{2}\right)$.

b. You can use the difference of squares and get $(5-2x)(5+2x)$.

c. You can use the quadratic formula to find roots of the equation

$$-18x^2+61x+7=0,$$

which is also $18x^2-61x-7=0$. You get:

$$x_{1,2}=\frac{61\pm\sqrt{61^2+4\cdot 18\cdot 7}}{36}=\frac{61\pm\sqrt{3721+504}}{36}=\frac{61\pm\sqrt{4225}}{36}=\frac{61\pm 65}{36}.$$

So the roots are $-\frac{1}{9}$ and $\frac{7}{2}$. So the polynomial can be factored as: $-\left(x+\frac{1}{9}\right)\left(x-\frac{7}{2}\right)$.

d. You can factor out an x and get $x(18x^2-61x-7)$, then use the quadratic formula to find roots of the equation

$$18x^2-61x-7=0.$$

You get:

$$x_{1,2}=\frac{61\pm\sqrt{61^2+4\cdot 18\cdot 7}}{36}=\frac{61\pm\sqrt{3721+504}}{36}=\frac{61\pm\sqrt{4225}}{36}=\frac{61\pm 65}{36}.$$

So the roots are $-\frac{1}{9}$ and $\frac{7}{2}$. So the polynomial can be factored as: $x\left(x+\frac{1}{9}\right)\left(x-\frac{7}{2}\right)$.