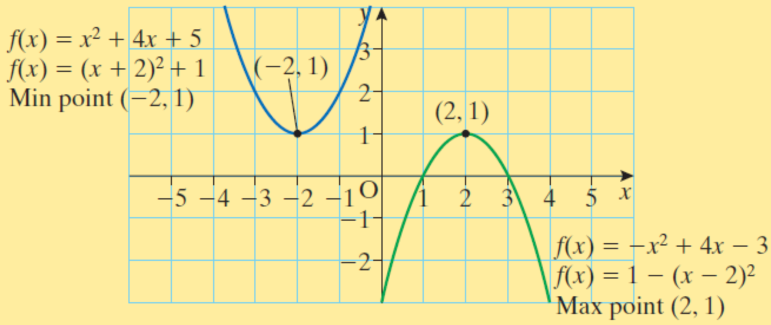
When quadratic expressions can be written as $a(x-p)^2+q$, there is a **minimum** point (p, q). When quadratic expressions can be written as $q-a(x-p)^2$, there is a **maximum** point (p, q).



4. The graph of $y=a(x-p)^2+q$ has a minimum point (p, q).
1 By completing the square, find the minimum point of each of the following quadratic equations: 2 hence solve

(i) $2x^2+4x-5=0$ (ii) $3x^2-6x-1=0$ (iii) $4x^2+x+3=0$

1 write in vertex form

related perfect square
$(a+b)^2 = a^2+2ab+b^2$

$a = x$
$b = 1 \Rightarrow b^2 = 1$

$(x+1)^2 = x^2+2x+1$

2 Vertex?

3 Solve

$$2x^2+4x-5=0$$
$$2\left[x^2+2x-\tfrac{5}{2}\right]=0$$
$$2\left[x^2+2x+1-1-\tfrac{5}{2}\right]=0$$
$$2\left[(x+1)^2-\tfrac{7}{2}\right]=0$$
$$2(x+1)^2-7=0 \quad \text{vertex form}$$

min pt. $(-1, -7)$

$$2(x+1)^2-7=0$$
$+7$: $2(x+1)^2=7$
$\div 2$: $(x+1)^2=\tfrac{7}{2}$
$\sqrt{\ }$: $x+1=\pm\sqrt{\tfrac{7}{2}}$
-1: $x=-1\pm\sqrt{\tfrac{7}{2}}$