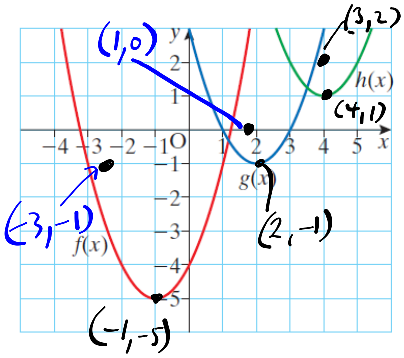
8. (i) Write down the coordinates (p, q) of the minimum point of each of these graphs.

(ii) Write the equation of each graph in the form

(a) $y = (x - p)^2 + q$

(b) $y = ax^2 + bx + c$. ✓

(iii) By picking a suitable point on each graph (other than the minimum point), verify each equation.



(ii) (a) $y = (x+1)^2 - 5 \overset{(b)}{=} x^2 + 2x + 1 - 5 = x^2 + 2x - 4$

$(-3,-1) \Rightarrow (-3)^2 + 2(-3) - 4 \overset{?}{=} -1$ ✓

(a) $y = (x-2)^2 - 1 \overset{(b)}{=} x^2 - 4x + 4 - 1 = x^2 - 4x + 3$

$(1,0) \Rightarrow (1)^2 - 4(1) + 3 \overset{?}{=} 0$ ✓

(a) $y = (x-4)^2 + 1 \overset{(b)}{=} x^2 - 8x + 16 + 1 = x^2 - 8x + 17$

$(3,2) \Rightarrow (3)^2 - 8(3) + 17 \overset{?}{=} 2$ ✓

9. If $f(x) = x^2 + 4x + 7$, find

(i) the smallest possible value of $f(x)$ 3

(ii) the value of x at which this smallest value occurs −2

(iii) the greatest possible value of $\dfrac{1}{(x^2 + 4x + 7)}$.

	x	$+2$
x	x^2	$2x$
$+2$	$2x$	4

$f(x) = x^2 + 4x + 7$

$= x^2 + 4x + 4 - 4 + 7$

$= (x+2)^2 + 3$

Vertex : $(-2, 3)$

(iii) ANS $= \dfrac{1}{3}$