Question		Answer	Marks	AO	Guidance
1	(a)	$a = 3$ $p = 1$ $q = -5$	B1 B1 B1 [3]	1.1 1.1 1.1	• Values may be embedded in an expression: $3(x + 1)^2 - 5$. • isw after correct answer seen
1	(b)	$a(x + p)^2$ is positive or zero, min value occurs when it is zero.	B1 [1]	2.2a	• FT *their* values of a, p and q dependent on *their* a being positive • a, p and q may be left as variables, a may be omitted • Allow fully correct alternative arguments (**see Appendix)** e.g. ▪ lowest value of *their* $3(x + 1)^2$ is 0, so minimum is $their - 5$ ▪ ($y =$) $a(x + p)^2$ has a minimum turning point when $y = 0$ **and** $a(x + p)^2 + q$ is a translation by $\begin{pmatrix} 0 \\ q \end{pmatrix}$ ▪ minimum value of $a(x + p)^2$ is 0 • Condone $(x + p)^2$ is positive (or > 0) so the minimum value is q

Appendix

Question 1b

The following comments would earn B1	**Commentary**
Curve $y = 3(x + 1)^2$ has a minimum $y = 0$ and is translated down 5	Accept for B1
Curve $3(x + 1)^2$ has a minimum $y = 0$ and is shifted down 5 units	Condone e.g. shift/lowered and omission of $y =$
When $x = -1$, $3(-1 + 1)^2 = 0$, so -5 is the minimum	Accept for B1

The following comments would earn B0	**Commentary**
Curve $y = x^2$ has a minimum at $y = 0$ and has been translated down 5 units	Need to relate to *their* $3(x + 1)^2$
Curve $y = 3(x + 1)^2$ has been then translated down 5 units	Need to state minimum value of $3(x + 1)^2$
The turning point is at $(-1, -5)$ so the minimum is -5	Need to explain how they know turning point is at $x = -1$ i.e. this is when $3(x + 1)^2 = 0$
When $x = -1$, $y = -5$	No mention of minimum
When $x = -1$, $3(-1 + 1)^2 - 5 = -5$ so minimum	No mention of 0
When $3(x + 1)^2 = 0$ the value will be q	Must say minimum or lowest value
The lowest value of $3(x + 1)$ is 0 so the min value is -5	Must see $3(x + 1)^2$