Question Number	Scheme	Marks
3.(a)	$4x^2 - 8x + 7 = l\left(x^2 - 2mx + m^2\right) + n$	M1
	$l = 4 \quad 2ml = 8 \quad m = 1$	A1
	$lm^2 + n = 7 \quad n = 3$	A1 (3)
	ALT: $\quad 4\left(x^2 - 2x\right) + 7 = 4\left(x-1\right)^2 + 3$	M1A1A1 (3)
(b)	(i) $\quad \mathrm{f}\left(x\right)_{\min} = 3$	B1ft
	(ii) $\quad$ when $x = 1$	B1ft (2)
		[5]

Notes

(a)

Note: there is only one method mark in part (a). The method MUST be complete for award of this mark

M1   for setting the given expression or f(x) equal to $l\left(x - m\right)^2 + n$ and attempting to

expand the $\left(x - m\right)^2$ into 3 terms, ie., $\left(x^2 \pm Amx \pm m^2\right)$ where $A \neq 0$

A1   for the values of $l = 4$, **and** $m = 1$.

Accept embedded values. If there is an error transferring the correct embedded value,

isw.

A1   for the value of $n = 3$

ALT

M1   for taking 4 as a common factor of the term in x^2 and $2x$, **and** attempting to

complete the square (usual rules – please refer to General Guidance)

A1   for achieving $4\left[\left(x-1\right)^2 - 1\right] + 7$ Penalise poor bracketing unless final answer is

correct.

A1   for the final answer $\{$ f(x)$\} = 4\left(x-1\right)^2 + 3$. Accept answers embedded in the

expression. If there is an error transferring the correct embedded value, isw.

(b)

B1ft   for minimum $= 3$ (ft their value of n)

B1ft   for $x = 1$ (ft their value for m)

There must be no transposition of the 3 and the 1 unless it is clear they write $\mathrm{f}(x) = 3$ and $x = 1$