4	**(a)**		$2(x + 1.5)^2 + 2.5$	**B1** **B1** **B1FT** **[3]**	**1.1a** **1.1a** **1.1a**	$p = 2$ $q = 1.5$ $r = 2.5$	Could be implied by $2(x + q)^2 + r$ Could be implied by $p(x + 1.5)^2 + r$ FT on their p and q ie $7 - pq^2$
4	**(b)**		$(-1.5, 2.5)$	**B1FT** **B1FT** **[2]**	**1.1** **1.1**	Correct x-coordinate Correct y-coordinate	FT on their (a) Could come from differentiation FT on their (a) No FT on incorrect x-value from differentiation
4	**(c)**		minimum value of the function = 2.5	**B1FT**	**3.1a**	FT on their minimum value	Allow BOD if different answers in **(a)** and **(b)** 2.5 must be stated as, or clearly intended to be, the minimum value Just (... , 2.5) is insufficient

Question	Answer	Marks	AO	Guidance	
	$\tan\theta = -1.5$ $\theta = -56.3^{\circ}$	**M1**	**3.1a**	Attempt to solve $\tan\theta =$ their (-1.5)	To obtain numerical value for θ Allow an angle in radians (expect -0.983 rad) Allow BOD if different answers in **(a)** and **(b)**
	$\theta = 124^{\circ}$	**A1** **[3]**	**1.1**	Obtain 124°, or better	**A0** if additional solutions Condone approaches other than 'hence' eg **B1** – attempt to solve $\tan\theta = -1.5$, from correct derivative (expect $4\tan\theta\sec^2\theta + 6\sec^2\theta = 0$) **B1** – obtain $\theta = 124^{\circ}$ **B1** – obtain min value of 2.5 (no FT)