1(a)	**Alternative method 1**		
	$(x-3)^2$	M1	may be preceded by $y =$
	3	A1	
	Alternative method 2		
	$(8 = x^2 - 6x + 17$ and) $x^2 - 6x + 9$ $(= 0)$	M1	
	3	A1	
1(b)	$(x+2)^2 - 4 + b$ or $-4 + b = 8$	M1	
	12	A1	SC1 12 from $(x-2)^2 - 4 + b$

Q	Answer	Mark	Comments
2	$(x+7)^2$ …	M1	
	$(x+7)^2 - 7^2 + 52$ or $(x+7)^2 - 49 + 52$ or $(x+7)^2 + 3$	M1dep	
	M2 seen and $(-7, 3)$	A1	
	Additional Guidance		
	Answer from other methods or with no method seen		M0M0A0
	Allow $(x+7)(x+7)$ for $(x+7)^2$ throughout		
	Condone inclusion of $= 0$ in all working		
	Ignore any solution attempt for $(x+7)^2 + 3 = 0$		

Q	Answer	Mark	Comments
3	$(x-9)^2\ldots$	M1	allow $\left(x-\frac{18}{2}\right)^2\ldots$ may be implied by a grid for $(x-9)^2$
	$(x-9)^2-9^2+70$ or $(x-9)^2-81+70$ or $(x-9)^2-11$	M1dep	oe completing the square eg $\left(x-\frac{18}{2}\right)^2-\left(\frac{18}{2}\right)^2+70$
	(9, –11) with correct completing the square seen	A1	eg (9, –11) with $(x-9)^2-9^2+70$ seen SC1 (9, –11) with correct completing the square not seen

Additional Guidance

Allow $(x-9)^2$ to be $(9-x)^2$ throughout	
Allow $(x-9)^2$ to be $(x-9)(x-9)$ throughout	
Condone expression = 0 throughout	
$(x-9)^2=11$ with $(x-9)^2-11\ (=0)$ also seen scores M1M1 Also scores A1 if answer correct	
$(x-9)^2=11$ without $(x-9)^2-11\ (=0)$ also seen Answer correct would still mean M1M0 (or SC1)	M1M0
Allow as a slip if completing the square seen but the squared is omitted in a subsequent line eg $(x-9)^2-81+70=(x-9)-11$ Answer (9, –11)	M1M1 A1
$(x-9)-11$ and answer (9, –11)	SC1
$(x-9)-11$ and answer not (9, –11)	M0M0A0
(9, –11) with no method or from a different method eg calculus	SC1

	x	–9
x	x^2	$-9x$
–9	$-9x$	81

Condone one of the products missing or incorrect — M1

Q	Answer	Mark	Comments
4(a)	(2, –9)	B2	B1 $x = 2$ or (2, …) or $y = -9$ or (…, –9) or $(x-2)^2 - 9$ B1ft correct y-coordinate for their x-coordinate with $x \neq -1$, 0 or 5 SC1 (–9, 2)
	Additional Guidance		
	If answer line is blank, check diagram for indication of x or y values		
	(3, –9)		B1
	(3, –8)		B1ft
	(1, –8)		B1ft
	(2.5, –8.75)		B1ft
	(0, –5)		B0ft

Q	Answer	Mark	Comments
5	$(x-3)^2 - 24$ or $a = 3$ and $b = 24$	B2	B1 $(x-3)^2$ … or $(x-3)(x-3)$ … or $a = 3$ (implied by 3, –24) or $x^2 - 2ax + a^2 - b$ or $-2a = -6$ or $2a = 6$ or $a^2 - b = -15$ or correct b for their a
	Additional Guidance		
	$(x+3)^2 - 24$ (24 is correct for $a = -3$)		B1
	$(x-6)^2 - 51$ (51 is correct for $a = 6$)		B1
	$(x+6)^2 - 51$ (51 is correct for $a = -6$)		B1

Q	Answer	Mark	Comments
6	**Alternative method 1**		
	dx^2 or $2dex$ or de^2	M1	
	$dx^2 + 2dex + de^2 + f$	M1dep	
	$2(x-3)^2 - 11$ or $d = 2,\ e = -3,\ f = -11$	A1	SC2 $2(x-6)^2 - 29$ SC1 $2(x-6)^2 + k \quad k \neq -29$ SC1 $2(x+6)^2 - 29$ SC1 $2(x+3)^2 + k$ SC1 $(x-3)^2 - 2$
	Alternative method 2		
	$2(x^2 \ldots)$ or $d = 2$	M1	
	$2(x^2 - 6x + \frac{7}{2})$ or $2(x^2 - 6x) + 7$ or $2(x-3)^2 + k$	M1dep	$k \neq -11$
	$2(x-3)^2 - 11$ or $d = 2,\ e = -3,\ f = -11$	A1	SC2 $2(x-6)^2 - 29$ SC1 $2(x-6)^2 + k \quad k \neq -29$ SC1 $2(x+6)^2 - 29$ SC1 $2(x+3)^2 + k$ SC1 $(x-3)^2 - 2$