

Completing the Square Mark Scheme:		
1(a)	$(x + 2)^2 - 4 + 5$	[1] Factorisation
	$(x + 2)^2 + 1$	[1] Final answer
1(b)	$(x - 7)^2 - 49 - 1$	[1] Factorisation
	$(x - 7)^2 - 50$	[1] Final answer
1(c)	$(x - 12)^2 - 144 + 5$	[1] Factorisation
	$(x - 12)^2 - 139$	[1] Final answer
2(a)	$(x + 5)^2 - 25 + 8$	[1] Factorisation
	$(x + 5)^2 - 17$	[1] Final answer
2(b)	$(x - 2)^2 - 4 + 16$	[1] Factorisation
	$(x - 2)^2 + 12$	[1] Final answer
2(c)	$(x - 4)^2 - 16 + 14$	[1] Factorisation
	$(x - 4)^2 - 2$	[1] Final answer
3(a)	$(x + 3)^2 - 9 + 20$	[1] Factorisation
	$(x + 3)^2 + 11$	[1] Final answer
3(b)	$(x + 6)^2 - 36 - 8$	[1] Factorisation
	$(x + 6)^2 - 44$	[1] Final answer
3(c)	$(x - 1)^2 - 1 - 6$	[1] Factorisation
	$(x - 1)^2 - 7$	[1] Final answer
4(a)	$x(x - 2) = 3$	[1] Mark for $x(x-2)=3$
	$x^2 - 2x = 3$	
	$x^2 - 2x - 3 = 0$	[1] Mark for rearranging to $x^2 - 2x - 3 = 0$
	$(x - 1)^2 - 1 - 3 = 0$	
	$(x - 1)^2 - 4 = 0$	[1] Mark for correct completion of the square $(x - 1)^2 - 4 = 0$

Turn over ►

4(b)	$(x - 1)^2 = 4$ $x = 1 \pm \sqrt{4}$	[1] Mark for rearranging for $x=1\pm\sqrt{4}$
	$x = 3$	[1] Mark for correctly choosing only $x=3$. ($x=-1$ must be eliminated because this gives a negative perimeter)
	$\text{Perimeter} = 3 + 1 + 3 + 1 = 8$	[1] Mark for perimeter = 8 cm
5	$x + \frac{1}{x} = 4$	[1] Mark for creating the equation $x + \frac{1}{x} = 4$
	$x^2 - 4x + 1 = 0$	[1] 1 Mark for rearranging the equation and multiply all terms by x
	$(x - 2)^2 - 3 = 0$ $(x - 2)^2 = 3$	[1] 1 Mark for completing the square $(x - 2)^2 - 3 = 0$
	$x = 2 \pm \sqrt{3}$	[1] 1 Mark for solving for $x = 2 \pm \sqrt{3}$
	$x = 2 + \sqrt{3}$	[1] Mark for stating that $x = 2 + \sqrt{3}$ is the only valid solution. ($x = 2 - \sqrt{3}$ would be less than 1)
6	$x(x + 6) = 36$	[1] 1 mark for $2x(x + 6) = 27$
	$x^2 + 6x - 36 = 0$ $[(x + 3)^2 - 9] - 36 = 0$ $(x + 3)^2 - 45 = 0$ $(x + 3)^2 = 45$	[1] Correct rearrangement and factorisation to $(x - 3)^2 = 45$
	$x + 3 = \pm\sqrt{45}$	[1] 1 mark for completing the square
	$x = -3 \pm \sqrt{45} = -3 + 3\sqrt{5}$	[1] 1 mark for eliminating $x = 3 - 3\sqrt{5}$ as not a real solution
	$\text{Perimeter} = x + x + x + 6 + x + 6 = 4x + 12$	[1] 1 mark for finding an expression for the perimeter of the rectangle.
	$4x + 12 = 4 \times (-3 + 3\sqrt{5}) + 12 = 12\sqrt{5}$	[1] 1 mark for the final answer

END