

Completing the Square Mark Scheme:		
1(a)	$\frac{2(x^2 + 4x) + 10}{2((x + 2)^2 - 4) + 10}$	[1] Mark for $(x + 2)^2$
	$2(x + 2)^2 + 2$	[1] Mark for $2(x + 2)^2 + 2$
1(b)	$\frac{2(x^2 - 8x) - 2}{2((x - 4)^2 - 16) - 2}$	[1] Mark for $(x-4)$ (Can be contained within another expression)
	$2(x - 4)^2 - 34$	[1] Mark final answer
1(c)	$\frac{3(x^2 - 8x) + 6}{3((x - 4)^2 - 16) + 6}$	[1] Mark for $(x - 4)^2$
	$3(x - 4)^2 - 42$	[1] Mark for final answer
2 (a)	$3((x + 3)^2 - 9) - 1$	[1] Mark for taking out a factor of 3
	$3(x + 3)^2 - 28$	[1] Mark for final answer
2(b)	$4((x - 1)^2 - 1) - 8$	[1] Correct factorising
	$4(x - 1)^2 - 12$	[1] Final answer
2(c)	$6((x - 2)^2 - 4) - 8$	[1] Correct factorising
	$6(x - 2)^2 - 32$	[1] Final answer

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3(a)	$3((x + 1)^2 - 1) - 8$	[1] Correct factorising
	$3(x + 1)^2 - 11$	[1] Final answer
3(b)	$5((x + 2)^2 - 4) - 12$	[1] Correct factorising
	$5(x + 2)^2 - 32$	[1] Final answer
3(c)	$8((x + 2)^2 - 4) - 12$	[1] Correct factorising
	$8(x + 2)^2 - 44$	[1] Final answer
4(a)	$2x(x - 2) = 16$	[1] Mark for $x(x-2)=3$
	$2x^2 - 4x = 16$ $2x^2 - 4x - 16 = 0$	[1] Mark for rearranging to $2x^2 - 4x - 3 = 0$
	$2((x - 1)^2 - 1) - 16 = 0$ $2(x - 1)^2 - 18 = 0$	[1] Mark for correct completion of the square $2(x - 1)^2 - 9 = 0$
4(b)	$(x - 1)^2 = 9$ $x = 1 \pm 3$	[1] Mark for rearranging
	$x = 4$	[1] Mark for correctly choosing only $x = 4$.
	$Perimeter = 8 + 8 + 2 + 2 = 20 \text{ cm}$	[1] Mark for $P = 20 \text{ cm}$
5	$2x(x + 6) = 27$	[1] 1 mark for $2x(x + 6) = 27$
	$2x^2 + 12x - 27 = 0$	[1] Rearranging
	$2(x - 3)^2 = 45$ $x - 3 = \pm \sqrt{\frac{45}{2}}$	[1] 1 mark for completing the square $x = 3 \pm \sqrt{\frac{45}{2}}$ OR $\frac{6+3\sqrt{10}}{2}$
	$x = -3 \pm \sqrt{\frac{45}{2}} = -3 \pm 3\sqrt{\frac{5}{2}}$	[1] 1 mark for eliminating $x = 3 - 3\sqrt{5}$ as not a real solution
	$Perimeter = 2x + 2x + x + 6 + x + 6 = 6x + 12$	[1] 1 mark for finding an expression for the perimeter of the rectangle.
	$6x + 12 = 6 \times \left(-3 \pm 3\sqrt{\frac{5}{2}}\right) + 12 = 9\sqrt{10} - 6$	[1] 1 mark for the final answer $P = 9\sqrt{10} - 6$

END