| Completing the Square $(a > 1)$ Mark Scheme | | |
|---|---|---|
| **1(a)** | $2(x^2 + 4x) + 10$<br>$2((x+2)^2 - 4) + 10$ | [1] Mark for $(x+2)^2$ |
| | $2(x+2)^2 + 2$ | [1] Mark for $2(x+2)^2 + 2$ |
| **1(b)** | $2(x^2 - 8x) - 2$<br>$2((x-4)^2 - 16) - 2$ | [1] Mark for $(x-4)$<br>(Can be contained within another expression) |
| | $2(x-4)^2 - 34$ | [1] Mark final answer |
| **1(c)** | $3(x^2 - 8x) + 6$<br>$3((x-4)^2 - 16) + 6$ | [1] Mark for $(x - 4)^2$ |
| | $3(x - 4)^2 - 42$ | [1] Mark for final answer |
| **2 (a)** | $3\left((x+3)^2 - 9\right) - 1$ | [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 |
| **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 $x(x-2) = 3$ |
| | $2x^2 - 4x = 16$<br>$2x^2 - 4x - 16 = 0$ | [1] Mark for rearranging to<br>$2x^2 - 4x - 3 = 0$ |
| | $2((x-1)^2 - 1) - 16 = 0$<br>$2(x-1)^2 - 18 = 0$ | [1] Mark for correct completion of the square $2(x-1)^2 - 18 = 0$ |
| **4(b)** | $(x-1)^2 = 9$<br>$x = 1 \pm 3$ | [1] Mark for rearranging |
| | $x = 4$ | [1] Mark for correctly choosing only $x = 4$.1a |
| | Perimeter $= 8 + 8 + 2 + 2 = 20$ cm | [1] Mark for $P = 20$ cm |

Turn over ►

| | | |
|---|---|---|
| **5** | $2x(x+6)=27$ | [1] 1 mark for $2x(x+6)=27$ |
| | $2x^2+12x\ -27=0$ | [1] Rearranging |
| | $2(x-3)^2=45$<br>$x-3=\pm\sqrt{\frac{45}{2}}$ | [1] 1 mark for completing the square<br>$x=3\ \pm\sqrt{\frac{45}{2}}$ OR $\frac{6+3\sqrt{10}}{2}$ |
| | $x=-3\pm\ \sqrt{\frac{45}{2}}=-3+3\sqrt{\frac{5}{2}}$ | [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. |
| | $6x+12=6\times\left(-3+3\sqrt{\frac{5}{2}}\right)+12=9\sqrt{10}-6$ | [1] 1 mark for the final answer<br>$P=9\sqrt{10}-6$ |

END