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|---|---|---|---|---|---|
| **24** | $2^3$ **and**<br>$2^{4x}$ or $(2^4)^x$ | | 5 | M1 | for writing $16^x$ **and** 8 as a power of 2 (or all as powers of 4,8 or 16) |
| | $n = x^2 + 4x + 3$ oe or<br>$x^2 + 4x + 3 - n = 0$ | | | A1 | for writing $n$ in terms of $x$<br>correct expression implies first M1 |
| | $(n =)(x+2)^2 - 2^2$.....oe or<br>$(x =) -2 \pm \sqrt{n+1}$<br>$(x =) \dfrac{-4 \pm \sqrt{4^2 - 4\times1\times(3-n)}}{2}$ oe | | | M1 | for a correct first step in completing the square or using the quadratic formula correctly ft their 3 term quadratic |
| | $(x =) -2 + \sqrt{n+1}$ oe or<br>$(x =) \dfrac{-4 + \sqrt{4^2 - 4\times1\times(3-n)}}{2}$ oe | | | A1 | for correctly rearranging to make $x$ the subject (must be positive square root) |
| | *Correct answer scores full marks (unless from obvious incorrect working)* | $(x =) -2 + \sqrt{n+1}$<br>**and** $n > 3$ | | A1 | must be positive square root<br>Accept $(x =) \sqrt{n+1} - 2$ oe and $3 < n$<br>Accept<br>$(x =) \dfrac{-4 + \sqrt{4^2 - 4\times1\times(3-n)}}{2}$ oe<br>**and** $n > 3$ or $3 < n$ |
| | | | | | **Total 5 marks** |

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|---|---|---|---|---|---|---|---|
| **24**<br>**ALT** | $4^{\frac{1}{2}n}$ , $4^{\frac{1}{2}x^2}$ , $4^{2x}$<br>**and** $4^{\frac{3}{2}}$ | $8^{\frac{1}{3}n}$ , $8^{\frac{1}{3}x^2}$<br>**and** $8^{\frac{4}{3}x}$ | $16^{\frac{1}{4}n}$ , $16^{\frac{1}{4}x^2}$<br>**and** $16^{\frac{3}{4}}$ | | 5 | M1 | for all as powers of 4 or 8 or 16 |
| | $n = x^2 + 4x + 3$ oe or<br>$x^2 + 4x + 3 - n = 0$ | | | | | A1 | for writing $n$ in terms of $x$<br>correct expression implies first M1 |
| | $(n =)(x+2)^2 - 2^2 \ldots\ldots$ oe or<br>$(x =) -2 \pm \sqrt{n+1}$<br>$(x =) \dfrac{-4 \pm \sqrt{4^2 - 4\times1\times(3-n)}}{2}$ oe | | | | | M1 | for a correct first step in completing the square or using the quadratic formula correctly ft their 3 term quadratic |
| | $(x =) -2 + \sqrt{n+1}$ oe or<br>$(x =) \dfrac{-4 + \sqrt{4^2 - 4\times1\times(3-n)}}{2}$ oe | | | | | A1 | for correctly rearranging to make $x$ the subject (must be positive square root) |
| | *Correct answer scores full marks (unless from obvious incorrect working)* | | | $(x =) -2 + \sqrt{n+1}$<br>**and** $n > 3$ | | A1 | must be positive square root<br>Accept $(x =) \sqrt{n+1} - 2$ oe and $3 < n$<br>Accept<br>$(x =) \dfrac{-4 + \sqrt{4^2 - 4\times1\times(3-n)}}{2}$ oe<br>**and** $n > 3$ or $3 < n$ |
| | | | | | | | **Total 5 marks** |