| Question | Scheme | Marks | AOs |
|---|---|---|---|
| | $16, 2, 19, 4, 22, 8, 25, 16, 28, 32, \ldots$ | | |
| **15(a)** | $k = 8$ | B1 | 2.2a |
| | | **(1)** | |
| **(b)** | Splits the sum into odd terms and even terms and sums their result. | M1 | 3.1a |
| | Odd terms: $S_{10} = \frac{10}{2}\left(2\times16+3\left(10-1\right)\right) = ...$ | M1 | 1.1b |
| | Even terms: $S_{10} = \frac{2(2^{10}-1)}{2-1} = ...$ | M1 | 1.1b |
| | Hence $\sum_{r=1}^{20} a_r = 2341$ | A1 | 2.1 |
| | | **(4)** | |
| | | | **(5 marks)** |

**Notes:**

**(a)**

**B1:** Deduces that $k = 8$

**(b)**

**M1:** An overarching problem solving mark for splitting the sum into odd and even terms and summing their result.

**M1:** Attempts to find the sum of the odd terms using $S_{10} = \frac{10}{2}\left(2\times16+3\left(10-1\right)\right)\left\{= 295\right\}$

**M1:** Attempts to find the sum of the odd terms using $S_{10} = \frac{2(2^{10}-1)}{2-1}\left\{= 2046\right\}$

**A1:** cso 2341