Practice worksheet | Sequences and series

Induction proofs of simple sums and arithmetic/geometric-series results

Name: _____ Date: _____

6 questions | 19 marks

1. Prove $3 + 7 + \cdots + (4n - 1) = n(2n + 1)$. [4 marks]

2. Prove $1 + 3 + \cdots + 3^{n-1} = \frac{3^n - 1}{2}$. [4 marks]

3. State the next term and required restriction in a proof of $a + ar + \cdots + ar^{n-1} = \frac{a(1-r^n)}{1-r}$. [2 marks]

4. Simplify $\frac{a(1-r^k)}{1-r} + ar^k$ to the next-case formula. [3 marks]

5. Use an arithmetic sum to find $5 + 8 + 11 + \cdots + 62$. [2 marks]

6. Prove $2 + 6 + \cdots + 2 \cdot 3^{n-1} = 3^n - 1$. [4 marks]