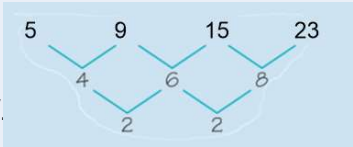


Sequences

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|----------------------------------|--|---|--|---|--|---|----|---|---|---|---|---|---|---|----|---|---|---|------|--|--|--|
| Keywords: | Arithmetic / n th term / Geometric / Term / Quadratic / Iterate | | | | | | | | | | | | | | | | | | | | | |
| Definition / Description: | Arithmetic – a sequence where terms are found by adding or subtracting an equal amount. | Nth term – The general rule of a number sequence. | Geometric - A sequence in which you find each term by multiplying the previous term by a fixed value. | Term – a part of an equation, expression or sequence. | Quadratic – A sequence where the difference increases or decrease by an equal amount each time | Iterate - a quantity arrived at by iteration. | | | | | | | | | | | | | | | | |
| Knowledge points: | Nth term of a linear sequence | Finding terms in a sequence | Nth term of a Quadratic sequence | Geometric Progression | Sequences by iteration | | | | | | | | | | | | | | | | | |
| Knowledge point examples: | <p>n: 1 2 3 4 2 5 8 11... +3 +3 +3 $3n - 1$</p> <p>The nth term of a linear sequence is always of the form $An \pm b$, where: A, is the difference between each term and the next term. b is the difference between the first term and A.</p> <p>n: 0 1 2 3 4 13 11 9 7 5 +2 -2 -2 -2 <u>$13 - 2n$</u></p> <p>In a descending sequence we find the <u>zero term</u> to discover what we are taking An way from.</p> | <p>From the sequence 5, 12, 19, 26, 33... work out the 50th term.</p> <p>The nth term of this sequence is $7n - 2$</p> <p>Find the 50th term by substituting $n=50$ into the rule, $7n - 2$</p> <p>$= 7 \times 50 - 2 = 350 - 2 = 348.$</p> | <p>Find the nth term in the sequence: 5, 9, 15, 23...</p> <p>Term</p> <p>1st Diff.</p> <p>2nd Diff.</p>  <p>The second differences are constant (2) so the sequence is quadratic and the coefficient of n^2 is 1. So the nth term includes $1n^2$. To find the remainder of the nth term, we subtract $1n^2$ from our sequence and find the nth term of the linear sequence left over:</p> <table style="margin-left: 20px;"> <tr><td>5</td><td>9</td><td>15</td><td>23</td></tr> <tr><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>1</td><td>4</td><td>9</td><td>16</td></tr> <tr><td>4</td><td>5</td><td>6</td><td>7...</td></tr> </table> <p>The nth term of this sequence is $n + 3$.</p> <p><i>Nth term of quadratic sequence</i> $= n^2 + n + 3$</p> | 5 | 9 | 15 | 23 | - | - | - | - | 1 | 4 | 9 | 16 | 4 | 5 | 6 | 7... | <p>Geometric progression is a sequence of non-zero numbers where each term after the first is found by multiplying the previous one by a number.</p> <p><u>Find the next two terms of the sequence</u></p> <p>3 6 12 24... x2 x2 x2</p> <p>The term to term rule here is $\times 2$ therefore the next two terms are $24 \times 2 = 48$ $48 \times 2 = 96$</p> | <p>Find the first four iterations of the iterative formula $x_{n+1} = 3x_n - 2$ with $x_1 = 2$.</p> <p>$x_2 = 3x_1 - 2$ $= 3 \times 2 - 2 = 4$</p> <p>$x_3 = 3x_2 - 2$ $= 3 \times 4 - 2 = 10$</p> <p>$x_4 = 3x_3 - 2$ $= 3 \times 10 - 2 = 28$</p> <p>$x_5 = 3x_4 - 2$ $= 3 \times 28 - 2 = 82$</p> | |
| 5 | 9 | 15 | 23 | | | | | | | | | | | | | | | | | | | |
| - | - | - | - | | | | | | | | | | | | | | | | | | | |
| 1 | 4 | 9 | 16 | | | | | | | | | | | | | | | | | | | |
| 4 | 5 | 6 | 7... | | | | | | | | | | | | | | | | | | | |
| Linked Knowledge | Notation and manipulation / Functions / Multiples, Primes, Factors / Index Numbers | | | | | | | | | | | | | | | | | | | | | |