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| **Topic/Skill**  | **Definition/Tips** | **Example****Topic: Sequences**  |
| 1. Linear Sequence | A number pattern with a **common difference**. | 2, 5, 8, 11… is a linear sequence |
| 2. Term | **Each value** in a sequence is called a term. | In the sequence 2, 5, 8, 11…, 8 is the third term of the sequence. |
| 3. Term-to-term rule | A rule which allows you to **find the next term** in a sequence if you **know the previous term**. | First term is 2. Term-to-term rule is ‘add 3’Sequence is: 2, 5, 8, 11… |
| 4. nth term | A rule which allows you to **calculate the term** that is in the **nth position** of the sequence.Also known as the ‘position-to-term’ rule.**n** refers to the **position** of a term in a sequence. | nth term is $3n-1$The 100th term is $3×100-1=299$ |
| 5. Finding the nth term of a linear sequence | 1. Find the **difference**.2. **Multiply that by** $n.$3. Substitute $n=1$ to **find out what number you need to add or subtract to get the first number in the sequence**. | Find the nth term of: 3, 7, 11, 15…1. Difference is +42. Start with $4n$3. $4×1=4$, so we need to subtract 1 to get 3.nth term = $4n-1$ |
| 6. Fibonacci type sequences | A sequence where the next number is found by **adding up the previous two terms**  | The Fibonacci sequence is:$$1,1,2,3,5,8,13,21,34…$$An example of a Fibonacci-type sequence is:$$4, 7, 11, 18, 29…$$ |
| 7. Geometric Sequence | A sequence of numbers where each term is found by **multiplying the previous one** by a number called the **common ratio, r**. | An example of a geometric sequence is:$$2, 10, 50, 250…$$The common ratio is 5Another example of a geometric sequence is:$$81, -27, 9,-3, 1… $$The common ratio is $-\frac{1}{3}$ |
| 8. Quadratic Sequence | A sequence of numbers where the **second difference is constant**.A quadratic sequence will have a $n^{2}$ term. | quadratic sequence: 2, 6, 12, 20, 30, 42 |
| 11. Triangular numbers | The sequence which comes from a pattern of dots that form a triangle.$$1, 3, 6, 10, 15, 21…$$ |  |

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| **Topic/Skill**  | **Definition/Tips** | **Example****Topic: Inequalities**  |
| 1. Inequality  | An inequality says that two values are **not equal**.$a\ne b$ means that a is not equal to b. | $$7\ne 3$$$$x\ne 0$$ |
| 2. Inequality symbols | $x>2$ means **x is greater than 2**$x<3$ means **x is less than 3**$x\geq 1$ means **x is greater than or equal to 1**$x\leq 6 $means **x is less than or equal to 6** | State the integers that satisfy $$-2<x\leq 4.$$-1, 0, 1, 2, 3, 4 |
| 3. Inequalities on a Number Line | Inequalities can be shown on a number line.**Open circles** are used for numbers that are **less than or greater than** $(<or>)$**Closed circles** are used for numbers that are **less than or equal or greater than or equal** $(\leq or\geq )$  | $x\geq 0$$x<2$$-5\leq x<4$ |

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| **Topic/Skill**  | **Definition/Tips** | **Example****Topic: Equations and Formulae**  |
| 1. Solve | To find the **answer**/value of something**Use inverse operations** on both sides of the equation (balancing method) until you find the value for the letter. | Solve $2x-3=7$Add 3 on both sides$$2x=10$$Divide by 2 on both sides$$x=5$$ |
| 2. Inverse | **Opposite** | The inverse of addition is subtraction.The inverse of multiplication is division. |
| 3. Rearranging Formulae | **Use inverse operations** on both sides of the formula (balancing method) until you find the expression for the letter. | Make x the subject of $y=\frac{2x-1}{z}$Multiply both sides by z$$yz=2x-1$$Add 1 to both sides$$yz+1=2x$$Divide by 2 on both sides$$\frac{yz+1}{2}=x$$We now have x as the subject. |
| 4. Writing Formulae | **Substitute letters for words** in the question. | Bob charges £3 per window and a £5 call out charge.$$C=3N+5$$Where N=number of windows and C=cost |
| 5. Substitution | **Replace letters with numbers**.Be careful of $5x^{2}$. You need to square first, then multiply by 5. | $a=3, b=2 and c=5.$ Find:1. $2a=2×3=6$ 2. $3a-2b=3×3-2×2=5$3. $7b^{2}-5=7×2^{2}-5=23$ |

**Knowledge Organiser**