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| **Topic/Skill**  | **Definition/Tips** | **Example****Year 9 Foundation Knowledge Organisers****N1 Integers** |
| 1. Integer | A **whole number** that can be positive, negative or zero. | $$-3, 0, 92$$ |
| 2. Negative Number | A number that is **less than zero**. Can be decimals. | $$-8, -2.5$$ |
| 3. Addition | To find the **total**, or **sum**, of two or more numbers.‘add’, ‘plus’, ‘sum’ | $$3+2+7=12$$ |
| 4. Subtraction | To find the **difference** between two numbers.To find out how many are left when some are taken away.‘minus’, ‘take away’, ‘subtract’ | $$10-3=7$$ |
| 5. Multiplication | Can be thought of as **repeated addition**. ‘multiply’, ‘times’, ‘product’ | $$3×6=6+6+6=18$$ |
| 6. Division | Splitting into equal parts or groups.The process of calculating the **number of times one number is contained within another one**.‘divide’, ‘share’ | $$20÷4=5$$$$\frac{20}{4}=5$$ |
| 7. BIDMAS | An acronym for the **order** you should do calculations in.BIDMAS stands for **‘Brackets, Indices, Division, Multiplication, Addition and Subtraction’**.Indices are also known as ‘powers’ or ‘orders’.With strings of division and multiplication, or strings of addition and subtraction, and no brackets, work from left to right. | $$6+3×5=21, not 45$$$5^{2}=25$, where the 2 is the index/power.$$12÷4÷2=1.5,not 6$$ |
| 8. Multiple | The result of multiplying a number by an integer.The **times tables** of a number. | The first five multiples of 7 are:$$7, 14, 21, 28, 35$$ |
| 9. Factor | A number that **divides exactly** into another number without a remainder.It is useful to write factors in pairs | The factors of 18 are:$$1, 2, 3, 6, 9, 18$$The factor pairs of 18 are:$$1, 18$$$$2, 9$$$$3, 6$$ |
| 10. Lowest Common Multiple (LCM) | The **smallest** number that is in the **times tables** of each of the numbers given. | The LCM of 3, 4 and 5 is 60 because it is the smallest number in the 3, 4 and 5 times tables. |
| 11. Highest Common Factor (HCF) | The **biggest** number that **divides exactly** into two or more numbers. | The HCF of 6 and 9 is 3 because it is the biggest number that divides into 6 and 9 exactly. |
| 12. Prime Number | A number with **exactly two factors**.A number that can only be divided by itself and one.The number **1 is not prime**, as it only has one factor, not two. | The first ten prime numbers are:$$2, 3, 5, 7, 11, 13, 17, 19, 23, 29$$ |
| 13. Prime Factor | A factor which is a prime number. | The prime factors of 18 are: $$2, 3$$ |
| 14. Product of Prime Factors | Finding out which **prime numbers multiply** together to make the **original** number.Use a **prime factor tree.**Also known as ‘prime factorisation’. |  |
| 15. Combination | A collection of things, where the **order does not matter**. | How many combinations of two ingredients can you make with apple, banana and cherry?Apple, BananaApple, CherryBanana, Cherry3 combinations |
| 16. Permutation | A collection of things, where the **order does matter**. | You want to visit the homes of three friends, Alex (A), Betty (B) and Chandra (C) but haven’t decided the order. What choices do you have?ABCACBBACBCACABCBA |
| 17. Permutations with Repetition | When something has $n$ different types, there are $n$ **choices each time**.Choosing $r$ of something that has $n$ different types, the permutations are:$$n×n×…\left(r times\right)=n^{r}$$ | How many permutations are there for a three-number combination lock?10 numbers to choose from $\{1, 2, ….10\}$ and we choose 3 of them 🡪$10×10×10=10^{3}=1000$ permutations. |
| 18. Permutations without Repetition | We have to **reduce the number of available choices each time**.One you have chosen something, you cannot choose it again. | How many ways can you order 4 numbered balls?$$4×3×2×1=24$$ |
| 19. Factorial | The factorial symbol ‘!’ means to multiply a series of descending integers to 1.Note: $0!=1$ | $$4!=4×3×2×1=24$$ |

**Knowledge Organiser**