

[Click Here](#)





















## Common formulas of maths

Mathematics is filled with various formulas and equations that describe relationships between different quantities. These include the Quadratic Formula, Slope-Intercept Form of a Line, Distance Formula, Pythagorean Theorem, Area of a Triangle, Circumference of a Circle, Sine, Cosine, and Tangent, Law of Sines, Law of Cosines, Power Rule for Derivatives, Chain Rule for Derivatives, Fundamental Theorem of Calculus, and formulas for operations like addition, subtraction, multiplication, and division. Given article text here Looking at these basic math formulas, it's clear why mastering them is essential for building a strong foundation in mathematics. Whether you're learning arithmetic, algebra, or geometry, having access to key formulas can simplify complex problems and provide the tools needed to tackle a wide range of mathematical challenges. Basic Math Formulas Provide Quick Solutions MathsKarma teaches students how to apply formulas for quick solutions Arithmetic is crucial for mathematical concepts Key formulas include sums and differences of numbers Algebraic formulas help solve relationships between numbers Geometry involves studying shapes with essential formulas Maths Equations: A World of Symbolic Expression The Motorsport Images Collections showcases events from 1895 to present day, offering a glimpse into the world of motorsports. Meanwhile, in the realm of mathematics, formulas hold the key to concise and powerful expression. Formulas, as described by Edsger Dijkstra, are worth a thousand pictures, providing a compact way to convey complex relationships between quantities. In science, formulas serve as a general construct, connecting given quantities in an informal yet meaningful manner. In mathematics, formulas typically refer to equations or inequalities that relate one mathematical expression to another. For instance, determining the volume of a sphere necessitates significant calculus, but once a formula is derived – such as  $V = \frac{4}{3} \pi r^3$  – the computation becomes a straightforward process. Mathematical formulas can take various forms, including algebraic, analytical, or closed-form expressions. They often represent mathematical models of real-world phenomena, enabling solutions to problems and offering insights into complex systems. Expressions and formulas are mathematical representations that serve different purposes. Formulas form the basis for calculations in various physical situations, allowing for specific solutions to problems. In contrast, expressions denote mathematical objects, without necessarily containing relations like equality or inequality. This distinction is similar to how a noun phrase refers to an object in natural language, while a whole sentence conveys a fact. For instance, " $8x - 5$ " is considered an expression, whereas " $8x - 5 \geq 3$ " is a formula that can be evaluated as true or false based on the value of  $x$ . In computer algebra and mathematical logic, formulas are viewed as expressions that can be assessed for their truth value given specific variable values. Chemical formulas, on the other hand, represent information about the proportions of atoms in a chemical compound using symbols, numbers, and sometimes additional signs. This notation system allows chemists to express complex molecular structures and relationships between elements in a concise manner. The empirical formula of a compound is determined by the ratio of its elements to the key element. For molecular compounds, these ratios can be expressed as whole numbers. However, some ionic compounds, such as boron carbide, have variable non-whole number ratios. Chemical formulas often employ various ways to suggest the structure of molecules, including molecular and condensed formulas. A structural formula is a drawing that shows the location of each atom and its bonds. In computing, a formula typically describes a calculation, such as addition, to be performed on variables. Computer spreadsheet software allows for formulas indicating how to compute cell values, while science often requires choosing units when using formulas to express relationships between quantities. An example of a scientific formula is Boltzmann's entropy equation:  $S = k \cdot \ln W$  (



S
=
k
⋅
ln
⁡
W


{\displaystyle S=k\cdot \ln W}

) where  $k$  is the Boltzmann constant and  $W$  is the number of microstates. Formulas are used in various disciplines to express relationships between quantities, such as temperature, mass, or charge in physics, or supply, profit, or demand in economics. **The Importance of Formulas in Mathematics** Mathematics is not just about solving problems; it's also about discovering new and interesting relationships between numbers. In everyday life, math can help us make informed decisions, such as choosing the best route to school or finding discounts on products. But math is not just limited to simple calculations - it has many formulas that can be used to solve complex problems. **Basic Formulas for Shapes** Here are some common formulas for different shapes: **Square**: Area = length<sup>2</sup>, Perimeter = 4 \* length **Rectangle**: Area = length \* width, Perimeter = 2 \* (length + width) **Circle**: Area =  $\pi$  \* radius<sup>2</sup>, Circumference =  $2 * \pi$  \* radius **Scalene Triangle**: Area =  $\frac{1}{2} * (s_1 * a + s_2 * b + s_3 * c)$ , where  $s$  is the semi-perimeter and  $a, b, c$  are the sides of the triangle. **Isosceles Triangle**: Area =  $\frac{1}{2} * \text{base} * \text{height}$ , Altitude =  $\sqrt{a^2 - b^2/4}$ , Perimeter =  $2a + b$  **Right Triangle**: Area =  $\frac{1}{2} * \text{base} * \text{height}$ , Perimeter =  $a + b + c$ , Semi-perimeter =  $(a + b + c) / 2$  **Equilateral Triangle**: Area =  $\frac{\sqrt{3}}{4} * \text{side}^2$ , Perimeter =  $3a$ , Semi-perimeter =  $3a / 2$  **Rhombus**: Perimeter =  $4 * \text{side}$ , Area =  $\frac{1}{2} * d_1 * d_2$ , where  $d_1$  and  $d_2$  are the diagonals. **Applications of Math** Math is all around us. It's used in science, engineering, economics, and many other fields to help solve problems and make predictions. By understanding these formulas and how they apply to real-world situations, we can gain a deeper appreciation for the power of mathematics. **Geometry Formulas** **Perimeter of a Parallelogram**:  $2(b + h)$  **Perimeter of a Trapezoid**:  $a + b + c + d$  **Area of a Trapezoid**:  $(\frac{1}{2}) * h * (a + b)$  **Surface area of a Cube**:  $6a^2$  **Volume of a Cube**:  $a^3$  **Surface area and volume formulas for various shapes** **Cuboid**:  $2(b + bh + hl)$  **Sphere**:  $\pi$  **Diameter**:  $2r$  **Circumference**:  $2\pi r$  **Surface area**:  $4\pi r^2$  **Volume**:  $(\frac{4}{3})\pi r^3$  **Hemisphere**:  $\pi r^2$  **Curved surface area**:  $2\pi r^2$  **Total surface area**:  $3\pi r^2$  **Volume**:  $(\frac{2}{3})\pi r^3$  **Trigonometry Formulas** **Sine**, cosine, and tangent definitions **Reciprocal identities** **Trigonometric values for special angles** **Product-to-sum formulas** **Pythagorean identities** **Other trigonometry formulas** **Periodicity of sine, cosine, and tangent functions** **Trigonometric Identities** **The sum and difference formulas for sine, cosine, and tangent functions** **The identity for tangent in terms of cotangent** **Sum and Difference Formulas** **Sine**:  $\sin(x \pm y) = \sin(x)\cos(y) \pm \cos(x)\sin(y)$  **Cosine**:  $\cos(x \pm y) = \cos(x)\cos(y) \mp \sin(x)\sin(y)$  **Tangent**:  $\tan(x \pm y) = \frac{\tan x \pm \tan y}{1 \mp \tan x \tan y}$  **Double Angle Formulas** **Sine**:  $\sin(2x) = 2\sin(x)\cos(x)$  **Cosine**:  $\cos(2x) = \cos^2(x) - \sin^2(x)$  or  $\cos(2x) = 2\cos^2(x) - 1$  **Tangent**:  $\tan(2x) = \frac{2\tan x}{1 - \tan^2(x)}$  **Half Angle Formulas** **Sine**:  $\sin(x/2) = \pm \sqrt{(1 - \cos x)/2}$  **Cosine**:  $\cos(x/2) = \pm \sqrt{(1 + \cos x)/2}$  **Tangent**:  $\tan(x/2) = \sqrt{(1 - \cos x)/(1 + \cos x)}$  **Algebraic Formulas** **Square of a binomial**:  $(a+b)^2 = a^2 + 2ab + b^2$  **Cube of a binomial**:  $(a+b)^3 = a^3 + 3ab(a - b)$  **Product of two numbers with different signs**:  $ab = x$  **Laws of Exponents** **Laws for multiplying and dividing exponents with the same base** **Law for raising an exponent to another power** **Other Formulas** **Pythagorean theorem**:  $x^2 + y^2 = z^2$  **Distributive property of multiplication over addition** **Commutative, associative, and additive inverse properties** **Zero property of multiplication** **Unit vector formula** Note that the text appears to be incomplete, as some formulas and identities are missing. Additionally, the formatting and organization of the text may vary depending on the source or context in which it was used. Given article text: |  $\hat{a}$  |  $\hat{b}$  |  $\hat{c}$  |  $\hat{d}$  |  $\hat{e}$  |  $\hat{f}$  |  $\hat{g}$  |  $\hat{h}$  |  $\hat{i}$  |  $\hat{j}$  |  $\hat{k}$  |  $\hat{l}$  |  $\hat{m}$  |  $\hat{n}$  |  $\hat{o}$  |  $\hat{p}$  |  $\hat{q}$  |  $\hat{r}$  |  $\hat{s}$  |  $\hat{t}$  |  $\hat{u}$  |  $\hat{v}$  |  $\hat{w}$  |  $\hat{x}$  |  $\hat{y}$  |  $\hat{z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |  $\hat{O}$  |  $\hat{P}$  |  $\hat{Q}$  |  $\hat{R}$  |  $\hat{S}$  |  $\hat{T}$  |  $\hat{U}$  |  $\hat{V}$  |  $\hat{W}$  |  $\hat{X}$  |  $\hat{Y}$  |  $\hat{Z}$  |  $\hat{A}$  |  $\hat{B}$  |  $\hat{C}$  |  $\hat{D}$  |  $\hat{E}$  |  $\hat{F}$  |  $\hat{G}$  |  $\hat{H}$  |  $\hat{I}$  |  $\hat{J}$  |  $\hat{K}$  |  $\hat{L}$  |  $\hat{M}$  |  $\hat{N}$  |