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What is period in maths

home / primary math / number / periodPeriods are groups of three digits separated by commas when writing numbers in standard form. This is particularly helpful for larger numbers, which can be difficult to read if there is no separation. For instance, if we wanted to write the following number written in word form, we could do so with or without commas: one billion, three hundred sixty-four million, five hundred seventy-two thousand, four hundred eighty-six. 1,364,572,486 1364572486 In the first representation above, we can see that the number has 4 periods. Each new set of 3 digits makes up 1 period. Without the separation, it is more difficult to read the number. Periods allow us to quickly determine the place values of various digits in the number and therefore the magnitude of the number, whether it be in the ones, thousands, millions, billions, and so on. Each period contains 3 places, the ones, tens, and hundreds place. For example, in the number 125, the first digit, 1, is in the hundreds place, the second is in the tens place, and the third is in the ones place. This pattern continues to the next three digits, such as 125,125, where the left-most digit is in the hundred thousands place, the next one is in the ten thousands place, and the third is in the thousands place. Below is a figure breaking up the above example into its respective place values. Sometimes, numbers are separated into periods by spaces, such as in 1 000, or even dots like in 1.000. However, this is less common, and not really recommended, since the dot can be confused with a decimal point. Decimal periods Decimal periods refer to the number of digits that repeat in a decimal. We can write numbers involving both types of periods: 127,922.46 The line over the "46" indicates that the 46 repeats indefinitely (127,922.4646464646...). The decimal period is therefore 2, since there are two repeating digits, while the rest of the number includes the ones and thousands periods. The formula for the period is used to calculate the time period of a wave. It is the time taken by a wave to reach from one peak to another. A periodic function is defined as a function that repeats its values at regular intervals or periods. The period of a function f(x) is p, if f(x + p) = f(x), for every x. Let us learn about the formula for the period with a few solved examples in the end. What is Formula for Period? According to the definition of a period of a function, a function f(x) will be periodic with period p, so if we have f (x + p) = f (x), for every p > 0. The period of each of sin x, cos x, csc x, and sec x = 2π. The period of each of tan x and cot x = π. The period of the wave decreases as its frequency increases. Here is the formula for period (T) of a trigonometric function: Period, T = Period of parent function/ |Coefficient of x| Frequency, F = 1/ Period Example: The period of tan 3x using the period formula is π / 3. You can observe this from the following graph also. Want to find complex math solutions within seconds? Use our free online calculator to solve challenging questions. With Cuemath, find solutions in simple and easy steps. Book a Free Trial Class Examples Using Formula for Period Example 1: Using the formula for period, find the period of the function f(x) = 2 sin (3x + 7) + 5. Solution: We know that the period of the parent function, which is sin, is 2π. The coefficient of x in the given function is 3. Using the formula for period, Period, T = (Period of parent function) / |Coefficient of x| Period, T = 2π / |3| = 2π / 3 Therefore, The period of f(x) = 2π / 3. Example 2: Find the period of the function \(f(x) = 3 \tan \left(\dfrac{\pi}{2}\left(x+2\right) \right) - 7\). Solution: We know that the period of the function, which is tan, is π. The given function can be written as: \(f(x) = 3 \tan \left(\dfrac{\pi}{2}x+\pi \right) - 7\) The coefficient of x in the given function is π/2. Using the formula for period, Period, T = (Period of parent function) / |Coefficient of x| \(\text{Period, }T =\dfrac{\pi}{\left|\dfrac{\pi}{2}\right| }=2\) Therefore, the period of f(x) = 2. Example 3: Using the formula for period, find the period of the function f(x) = 2 sin (4x + 8) + 10. Solution: We know that the period of the parent function, which is sin, is 2π. The coefficient of x in the given function is 4. Using the formula for period, Period, T = (Period of parent function) / |Coefficient of x| Period, T = 2π / |4| = 2π / 4 = π / 2 Therefore, The period of f(x) = π / 2 The formula for period is used to calculate the time interval taken by a wave to complete one cycle of vibration at a given point . A periodic function is defined as a function that repeats its values at regular intervals or periods. The period of a function f(x) is p, if f(x + p) = f(x), for every x. A function is said to be periodic if its value repeats after regular periods (intervals). The formula is Period, P = Period of parent function/ |Coefficient of x| What is the Formula to Find the Period? a function f(x) will be periodic with period p, so if we have f (x + p) = f (x), for every p > 0. The period of each of sin x, cos x, csc x, and sec x = 2π. The period of each of tan x and cot x = π. Here is the formula for period (T) of a trigonometric function: Period, P = Period of parent function/ |Coefficient of x| How to Find the Formula for Period? Listed below are three main aspects to finding the formula for period: Find if it is a periodic function i.e. if the function repeats over at a constant period If the formula for period function is represented like f(x) = f(x + p), where p is the real number Period means the time interval between the two occurrences of the wave What Role does Amplitude play in Formula for Period? On a graph, a period is when the function goes from one point to the next matching point. In amplitude helps in measuring the height of the function point measured from the highest to the lowest. The term “period” is used in different ways or contexts in mathematics such as period of a function, decimal periods, periods in place value chart, or period in context of time. Period as a general term refers to the measurable portion of time. School hours are divided into periods, such that each period represents a certain time-interval in which you study a particular subject. It is used as a point to mark the end of an event in the cycle. We will define “period” in terms of different contexts. Period of a function: Period of a function is the interval at which the function repeats itself. A function is said to be periodic with period $T\gt 0$ if $f(x + T) = f(x)$ for all x in the domain of f. Period of a Repeating Decimal: The recurring part (the recurring digit or the group of recurring digits) in a repeating decimal is called the period of the decimal. Period in Place Value Chart: In the place value chart, when a number is written in standard form, each group of digits separated by a comma is called a period. Period in terms of time: Period is defined as the measurable portion of time or completion of cycle. More Worksheets A periodic function is defined as a function that repeats its values at regular intervals or periods. Such functions return the same value at regular intervals. This regular interval is known as the period of the function. A function $f(x)$ is said to be periodic with period T if $f(x + T) = f(x)$, for $T \gt 0$. The least positive value of T is called the fundamental period.In trigonometry, you must have seen graphs in which functions repeat themselves. The length of one complete cycle of a trigonometric function is referred to as the period of the function. Look at the graph of the function sin x. You can see that the graph repeats itself after equal interval of 2. Thus, the period of the sine function is 2. FunctionPeriod$\sin\; x$$2\pi$$\cos\; x$$2\pi$$\tan\; x$$\pi$$\cosec\; x$$2\pi$$\sec\; x$$2\pi$$\cot\; x$$\pi$ $T = \frac{Period of parent function}{| Coefficient of x |}$ Example: Period of $\sin\; 2x = T = \frac{2\pi}{2} = \pi$ Frequency $= F = \frac{1}{Period} = \frac{1}{T}$ Frequency refers to the number of times the graph of a function repeats itself in a given amount of time. A period refers to a group of three digits in the place value chart separated by a comma when a number is written in the standard form. Periods help in understanding the place values of the digits. Place value is a numerical value that every digit in a number has based on its position. It can be extremely difficult to read big numbers without periods. Here’s an example: 1,643,752,648 is much easier to read and understand than 1643752648. In the International place-value system, there are four periods namely Ones, thousands, millions, and billions for the twelve places from right to left. In the number 1,643,752,648, there are four periods. Each set with 3 digits makes 1 period. Here’s another visual example: BillionsMIllionsThousandsOnesHBTBBHMTMMHThTThThHTO1643752648 Repeating or recurring decimals contain a digit or a group of digits that repeat endlessly and so, are called periodic. The digits in the repeating section are called its period. The number of repeating digits is called the length of period or the periodicity of the repeating decimal. Examples of decimal periods: $\frac{1}{3} = 0.33333333... = 0.\overline{3}$ Period of $\frac{1}{3} = 3$ Length of period $= 1$ $\frac{41}{333} = 0.123123123... = 0.\overline{123}$ Period of $\frac{41}{333} = 123$ Length of period $= 3$ $\frac{1}{7} = 0.142857142857...= 0.\overline{142857}$ Period of $\frac{1}{7} = 142857$ Length of period $= 6$ In the International place value chart, nine places are grouped into 3 periods – ones, thousands, and millions. In the Indian place value chart, nine places are grouped into 4 periods – ones, thousands, lakhs, and crores. A period (or full stop) is a punctuation mark in English represented by a small dot (.). It is used to express that a sentence is complete. It is also used in abbreviations. In this article, we discussed the meaning of ‘period’ in math with respect to different contexts – period of a function, period in place values, decimal periods. Let’s solve a few examples for better understanding. 1. Find the period of $\frac{5}{6}$. Solution: Convert the fraction into decimal form. $\frac{5}{6} = 0.833333333... = 0.8\overline{3}$ Period of $\frac{5}{6} = 3$ Length of period $= 1$ 2. Find the period of 7 in 85,476,280. Solution: MIllionsThousandsOnesHundred MillionsTen MillionsMillionsHundredThousandsTenThousandsThousandsHundredsTensOnes85476280 The digit 7 is placed in the thousands period. Place value of 7 in $85,476,280 = 50,000$. 3. Find the period of $f(x) = cos(3x)$ if the period of $cos(x)$ is 2π. Solution: The period of $cos(x)$ is 2π. The coefficient of x is 3. Period of any function $f(x) = T = \frac{Period of parent function}{| Coefficient of x |}$Therefore, period of the given function $= \frac{2\pi}{3}$ Attend this quiz & Test your knowledge.Correct answer is: Ones PeriodThe digit 1 is placed at the hundreds place which is part of the Ones period.Correct answer is: ThreeThree digits make up one period.Correct answer is: πThe period of tan x is π.Correct answer is: 3The length of the period is the number of repeating digits. Here, 456 is the period and the length of the period is 3.Correct answer is: 1The length of the period is the number of digits that repeat itself. Here “3” is the period and the length of the period is 1. How are periods shown in the international place value chart? The international place value chart has three major periods – ones, thousands, and millions. Each period comprises three place values, namely ones, tens, and hundreds. What is a period for a decimal number? The recurring decimals have digits that repeat endlessly and so are called periodic. The digits that repeat are called its period and the number of digits that repeat is called the length of the period. Can the period of a trigonometric function be negative? No. Since the period refers to the length of the time-interval, it must always be positive. What are the places included in the Ones period in math? Ones period (units period) in math has three places – Ones, Tens, and Hundreds. What does period mean in math? The term “period” is used in different contexts such as period of a function, period of a repeating decimal, periods in place value chart, or period in context of time. The Motorsport Images Collections captures events from 1895 to today’s most recent coverage.Discover The CollectionCurated, compelling, and worth your time. Explore our latest gallery of Editors’ Picks.Browse Editors' FavoritesExperience AI-Powered CreativityThe Motorsport Images Collections captures events from 1895 to today’s most recent coverage.Discover The CollectionCurated, compelling, and worth your time. Explore our latest gallery of Editors’ Picks.Browse Editors' FavoritesExperience AI-Powered CreativityThe Motorsport Images Collections captures events from 1895 to today’s most recent coverage.Discover The CollectionCurated, compelling, and worth your time. Explore our latest gallery of Editors’ Picks.Browse Editors' FavoritesExperience AI-Powered Creativity Three Functions, but same idea. Right Triangle Sine, Cosine and Tangent are the main functions used in Trigonometry and are based on a Right-Angled Triangle. Before getting stuck into the functions, it helps to give a name to each side of a right triangle: "Opposite" is opposite to the angle θ "Adjacent" is adjacent to (next to) the angle θ "Hypotenuse" is the long one Opposite is always opposite the angle And Adjacent is always next to the angle Sine, Cosine and Tangent (often shortened to sin, cos and tan) are each a ratio of sides of a right angled triangle: For a given angle θ each ratio stays the same no matter how big or small the triangle is To calculate them: Divide the length of one side by another side Using this triangle (lengths are only to one decimal place): sin(35°) = OppositeHypotenuse = 2.84.9 = 0.57... cos(35°) = AdjacentHypotenuse = 4.04.9 = 0.82... tan(35°) = OppositeAdjacent = 2.84.0 = 0.70... Size Does Not Matter The triangle can be large or small and the ratio of sides stays the same. Only the angle changes the ratio. Let's play with the triangle: Drag point 'A' to see how changing the angle affects the ratios. Drag point 'B' to change the size. algebra/images/sin-cos-tan.js Good calculators have sin, cos and tan on them, to make it easy for you. Just put in the angle and press the button. But you still need to remember what they mean! In picture form: Practice Here: geometry/images/triangle-q.js How to remember? Think "Sohcahtoa"! It works like this: Soh... Sine = Opposite / Hypotenuse ...cah... Cosine = Adjacent / Hypotenuse ...toa Tangent = Opposite / Adjacent You can read more about sohcahtoa. Remember it, as it may help in an exam ! Move the mouse around to see how different angles (in radians or degrees) affect sine, cosine and tangent. algebra/images/circle-triangle.js In this animation the hypotenuse is 1, making the Unit Circle, which is like a map for trigonometry. Notice that the adjacent side and opposite side can be positive or negative, which makes the sine, cosine and tangent change between positive and negative values also. "Why didn't sin and tan go to the party?" "... just cos!" The classic 30° triangle has a hypotenuse of length 2, an opposite side of length 1 and an adjacent side of√3: Now we know the lengths, we can calculate the functions: Sine sin(30°) = 1 / 2 = 0.5 Cosine cos(30°) = 1.732 / 2 = 0.866... Tangent tan(30°) = 1 / 1.732 = 0.577... (get your calculator out and check them!) The classic 45° triangle has two sides of 1 and a hypotenuse of √2: Sine sin(45°) = 1 / 1.414 = 0.707... Cosine cos(45°) = 1 / 1.414 = 0.707... Tangent tan(45°) = 1 / 1 = 1 With these three magical functions, we're equipped to solve all sorts of real-world problems, because they let us: work out angles when we know sides work out sides when we know angles Example: Use the sine function to find "d" We know: The cable makes a 39° angle with the seabed The cable has a 30 meter length And we want to know "d" (the distance down). Start with:sin 39° = opposite/hypotenuse sin 39° = d/30 Swap Sides:d/30 = sin 39° Use a calculator to find sin 39°: d/30 = 0.6293... Multiply both sides by 30:d = 0.6293... x 30 d = 18.88 to 2 decimal places. The depth "d" is 18.88 m Exercise Try this paper-based exercise where you can calculate the sine function for all angles from 0° to 360°, and then graph the result. It will help you to understand these relativelysimple functions. You can also see Graphs of Sine, Cosine and Tangent. And play with a spring that makes a sine wave. Less Common Functions To complete the picture, there are 3 other functions where we divide one side by another, but they are not so commonly used. They are equal to 1 divided by cos, 1 divided by sin, and 1 divided by tan: Secant Function: sec(θ) = HypotenuseAdjacent (=1/cos) Cosecant Function: csc(θ) = HypotenuseOpposite (=1/sin) Cotangent Function: cot(θ) = AdjacentOpposite (=1/tan) 1494, 1495, 724, 725, 1492, 1493, 726, 727, 2362, 2363 Copyright © 2025 Rod Pierce Trigonometry: from Greek trigonon "triangle" + metron "measure" Want to learn Trigonometry? Here is a quick summary. Follow the links for more, or go to Trigonometry Index Trigonometry ... is all about triangles. Trigonometry helps us find angles and distances, is used a lot in science, engineering, video games, and more! Right-Angled Triangle The triangle of most interest is the right-angled triangle. The right angle is shown by the little box in the corner: Another angle is often labeled θ, and the three sides are then called: Adjacent: adjacent (next to) the angle θ Opposite: opposite the angle θ and the longest side is the Hypotenuse Why is this triangle so important? Imagine we can measure along and up but want to know the direct distance and angle: Trigonometry can find that missing angle and distance. Or maybe we have a distance and angle and need to "plot the dot" along and up: Questions like these are common in engineering, computer animation and more. And trigonometry gives the answers! The main functions in trigonometry are Sine, Cosine and Tangent They are simply one side of a right-angled triangle divided by another. For any angle "θ": (Sine, Cosine and Tangent are often abbreviated to sin, cos and tan.) Using this triangle (lengths are only to one decimal place): sin(35°) = OppositeHypotenuse = 2.84.9 = 0.57... The triangle could be larger, smaller or turned around, but that angle will always have that ratio. Calculators have sin, cos and tan to help us, so let's see how to use them: We can't reach the top of the tree, so we walk away and measure an angle (using a protractor) and distance (using a laser): We know the Hypotenuse And we want to know the Opposite Sine is the ratio of Opposite / Hypotenuse: sin(45°) = Opposite Hypotenuse Get a calculator, type in "45", then the "sin" key: sin(45°) = 0.7071... What does the 0.7071... mean? It is the ratio of the side lengths, so the Opposite is about 0.7071 times as long as the Hypotenuse. We can now put 0.7071... in place of sin(45°): 0.7071... = Opposite Hypotenuse And we also know the hypotenuse is 20: 0.7071... = Opposite 20 To solve, first multiply both sides by 20: 20 × 0.7071... = Opposite Finally: Opposite = 14.14m (to 2 decimals) When you gain more experience you can do it quickly like this: Example: How Tall is The Tree? Start with:sin(45°) = Opposite Hypotenuse We know:0.7071... = Opposite 20 Swap sides: Opposite 20 = 0.7071... Multiply both sides by 20: Opposite = 0.7071... × 20 Calculate:Opposite = 14.14 (to 2 decimals) The tree is 14.14m tall Try Sin Cos and Tan Play with this for a while (move the mouse around) and get familiar with values of sine, cosine and tangent for different angles, such as 0°, 30°, 45°, 60° and 90°. ../algebra/images/circle-triangle.js Also try 120°, 135°, 180°, 240°, 270° etc, and notice that positions can be positive or negative by the rules of Cartesian coordinates, so the sine, cosine and tangent change between positive and negative also. So trigonometry is also about circles! Unit Circle What you just played with is the Unit Circle. It is a circle with a radius of 1 with its center at 0. Because the radius is 1, we can directly measure sine, cosine and tangent. Here we see the sine function being made by the unit circle: images/circle-sine.js Note: you can see the nice graphs made by sine, cosine and tangent. Degrees and Radians Angles can be in Degrees or Radians. Here are some examples: Angle Degrees Radians Right Angle 90° π/2 Straight Angle __ 180° π Full Rotation 360° 2π Repeating Pattern Because the angle is rotating around and around the circle the Sine, Cosine and Tangent functions repeat once every full rotation (see Amplitude, Period, Phase Shift and Frequency). When we want to calculate the function for an angle larger than a full rotation of 360° (2π radians) we subtract as many full rotations as needed to bring it back below 360° (2π radians): 370° is greater than 360° so let us subtract 360° 370° − 360° = 10° cos(370°) = cos(10°) = 0.985 (to 3 decimal places) And when the angle is less than zero, just add full rotations. −3 is less than 0 so let us add 2π radians −3 + 2π = −3 + 6.283... = 3.283... radians sin(−3) = sin(3.283...) = −0.141 (to 3 decimal places) Solving Triangles Trigonometry is also useful for general triangles, not just right-angled ones . It helps us in Solving Triangles. "Solving" means finding missing sides and angles. We can also find missing side lengths. The general rule is: When we know any 3 of the sides or angles we can find the other 3 (except for the three angles case) See Solving Triangles for more details. Other Functions (Cotangent, Secant, Cosecant) Similar to Sine, Cosine and Tangent, there are three other trigonometric functions which are made by dividing one side by another: Cosecant Function: csc(θ) = Hypotenuse / Opposite Secant Function: sec(θ) = Hypotenuse / Adjacent Cotangent Function: cot(θ) = Adjacent / Opposite And as you get better at Trigonometry you can learn these: Enjoy becoming a triangle (and circle) expert! Copyright © 2025 Rod Pierce ABCDEFGHIJKLMNOPQRSTUVWXYZ In Mathematics: The length from one peak to the next (or from any point to the next matching point) of a periodic function. In other words the length of one full cycle. In Physics: • the period is the time (from one peak to the next) • the wavelength is the distance (from one peak to the next) Copyright © 2024 Rod Pierce