To place fractions on a number line: Subtract one from the denominator of the fraction. Draw this many evenly-spaced lines between each whole number. Locate the whole number part of the fraction on the number line. Count on from here by the number of lines equal to the numerator of the fraction. For example, place the fraction 2 1/3 on a number line. 2 1/3 is a mixed number. Step 1. Subtract one from the denominator of the fraction The denominator is the number on the bottom of the fraction. We have a 3 on the denominator of the fraction of 2 1/3. 3 – 1 = 2 and so, we draw 2 lines between each whole number on the number line to divide it into thirds. We draw the lines equally spaced so that each whole number is divided into equal parts. Step 2. Draw this many evenly-spaced lines between each whole number Step 3. Locate the whole number part of the fraction on the number line In the fraction 2 1/3, the whole number is 2. Therefore we move to the position of 2. Step 4. Count on from here by the number of lines equal to the numerator of the fraction The numerator is the number on top of a fraction. In the fraction 2 1/3, the numerator of the fraction is 1. So we count on from the number 2 by 1 more line. This is the position of the fraction 2 1/3. Here is another example of plotting a mixed fraction on a number line. Plot the fraction 1 3/4 on the number line. Step 1. Subtract one from the denominator of the fraction Step 2. Draw this many evenly-spaced lines between each whole number On the fraction 1 3/4, the denominator is 4. 4 – 1 = 3 and so, we draw 3 lines between each whole number to divide them into quarters. Step 3. Locate the whole number part of the fraction on the number line Step 4. Count on from here by the number of lines equal to the numerator of the fraction The fraction of 1 3/4 has a whole number In this section we display different types of fractions on a number line. Different charts are used to display the different types of fraction. The number line below shows halves from 0 to 1. Divide the number line so that there are 2 parts between each whole number. The fraction 1/2 is found at the halfway point between 0 and 1. Here is a number line containing halves for numbers beyond 1. A line separates each whole number to divide them into halves. To place one third on a number line: Draw two equally-spaced lines between 0 and 1 to divide the line into thirds. One third is located at the first of these lines. 1/3 is found at the first line drawn between 0 and 1. 2/3 is found at the first line drawn between 0 and 1. The number line below shows thirds beyond 1 whole. Divide each whole number into thirds by drawing two equally-spaced lines between them. The number line below shows thirds from zero to five. Improper fractions are shown on the top of the number line. Improper fractions are fractions in which the numerator on top of the fraction is a larger number than the denominator on the bottom of the fraction. When counting up in thirds, the denominator remains as a '3' but the numerator increases by 1 each time. 3/3 is equal to one whole. 6/3 is equal to 2. 9/3 is equal to 3. To place one quarter on a number line Divide the distance from 0 to 1 into quarters by drawing three equally-spaced lines. 1/4 is positioned on the first line between 0 and 1. Quarters greater than 1 are shown on the following number line. To locate quarters on a number line, divide each whole number into four parts using three equally-spaced lines. To place one fifth on a number line Divide the distance from 0 to 1 into fifths by drawing four equally-spaced lines. 1/5 is positioned on the first of these lines between 0 and 1. The number line below shows fifths on greater than 1 whole on a number line. To place sixths on a number line Divide each whole number into sixths by drawing five equally-spaced lines between them. 1/6 is positioned on the first of these lines between 0 and 1. The number line below shows sixths beyond one whole. To place eighths on a number line Divide each whole number into eighths by drawing seven equally-spaced lines between them. 1/8 is positioned on the first of these lines between 0 and 1. The number line below shows eighths greater than one whole. To place tenths on a number line Divide each whole number into tenths by drawing nine equally-spaced lines between them. 1/10 is positioned on the first of these lines between 0 and 1. The number line below shows tenths greater than one whole. Negative fractions are shown on a number line to left of zero. The further left, the larger the size of the negative fraction. Divide each negative whole number into equally-sized parts to split them into fractions. For example, the number line below shows negative fractions of one half. Each whole number is divided into two halves by drawing a line between them. –1/2 is the first line to the left of zero between zero and negative one. To place a negative fraction on a number line: Subtract one from the denominator of the fraction. Draw this many evenly-spaced lines between each whole number to the left of zero. Locate the whole number part of the fraction on the number line. Count on further left from here by the number of lines equal to the numerator of the fraction. For example, place -1 2/3 on the number line. Subtract one from the denominator of the fraction The denominator of the fraction is the number on the bottom of the fraction. In this example, the denominator is 3. 3 – 1 = 2. Draw this many evenly-spaced lines between each whole number to the left of zero Each whole number is split into thirds by drawing two evenly-spaced lines between them. Locate the whole number part of the fraction on the number line The whole number part of the fraction of -1 2/3 is -1. -1 is the first whole number to the left of zero. Count on further left from here by the number of lines equal to the numerator of the fraction The numerator of the fraction is the number on top of the fraction. In this example, the numerator is 2. We count left 2 more places. Therefore -1 2/3 is located by counting on two more thirds to the left of -1. It is shown on the number line below. Benchmark fractions are well known reference amounts that other fractions and quantities can be easily compared to. Some examples include one half, one third and one quarter. Their sizes are commonly understood and they can be used in easily in speech for describing amounts. For example, to explain how large 4/7 is, we can say that it is slightly larger than 1/2 but less than 2/3. Here are some benchmark fractions shown on a number line. This chart can be used to better visualise benchmark fractions Common fractions written as decimals include: 1/8 = 0.125 1/5 = 0.2 1/4 = 0.25 1/3 = 0.333… 1/2 = 0.5 3/4 = 0.75 Unit fractions are fractions that have a numerator equal to 1. The denominator tells us how many equally-sized parts one whole is divided into. Therefore the larger the denominator of a unit fraction, the smaller the fraction. The unit fractions of 1/2, 1/3 and 1/4 are shown on the number line below. 1/2 divides one whole into two equal parts. 1/3 divides one whole into three equal parts. 1/4 divides one whole into four equal parts. 1/2 is larger than 1/3 which is larger than 1/4. To add fractions on a number line: Divide each number on the number line into the number of parts shown on the denominator. Start by at the location of the first fraction. Count on by the number of parts shown on the top of the fraction being added. For example, add 1/4 + 2/4. Step1. Each number on the number line is divided into four equal parts. Step 2. The first fraction is 1/4, so we start by locating this fraction on the number line. Step 3. We will then add 2/4, so we count on to the right by 2 more places. We arrive at 3/4, therefore 1/4 + 2/4 = 3/4. To subtract fractions on a number line: Divide each number on the number line into the number of parts shown on the denominator. Start by at the location of the first fraction. Count left by the number of parts shown on the top of the fraction being subtracted. For example, subtract the fractions 2 1/3 – 2/3. Step 1. Divide each number on the number line into 3 equal parts. Step 2. Start by locating the first fraction, which is 2 1/3. Step 3. We then subtract 2/3, so we count left 2 places. We arrive at the answer: 2 1/3 – 2/3 = 1 2/3. Equivalent fractions represent the same value and therefore they occupy the same position along a number line. Equivalent fractions can be seen on a number line as they will be located at the same position. For example, 1/2 is equivalent to 2/4 and 3/6 as they all line up on a number line in the same position. They are all located half way between 0 and 1 and so, they are all equal to one half. Using number lines to teach fractions helps to visualise their relative sizes in comparison with other numbers. They allow us to visualise fractions as part of a continuous scale rather than as a portion of a fixed set. Number lines can be particularly useful for representing addition and subtraction of fractions and fractions greater than one whole. Number lines allow a visual representation of the sizes of each fraction We can see how far apart different fractions are and where fractions compare to whole numbers much more clearly on a number line. Number lines give us a sense of scale. Number lines are way to find equivalent fractions Equivalent fractions occupy the same location along a number line. By placing number lines above one another, they can be a good way to visualise the concept of equivalent fractions. We can count along number lines until we find fractions that are in line with others and then we can say that they are equivalent. Number lines are a way to represent fractions in a continuous scale Fractions are typically taught as smaller amounts of a larger whole. We might teach one half of a shape or one tenth of a block of chocolate. Students become used to fractions only being used to represent a smaller part of a larger total. However number lines allow students to become more familiar with fractions on any larger scale, beyond one whole. This is useful for applying fractions to further real-life situations such as reading measuring scales, displaying time lines or representing speed or distance. Count the spaces between each number, not the lines. The example below shows the fraction 3/4. We have counted three of the four spaces. Students can naturally count the lines instead of the spaces as a common misconception. Counting the lines, they incorrectly obtain 4/5 instead of 3/4. Addition is one of the fundamental operations performed in everyday life. See addition worksheets Algebra is where letters, numbers, and symbols are given a purpose in math operations. See algebra worksheets These worksheets and lessons focus on the four fundamental math operations. See basic operations worksheets We not only compare and order integers, but we also compare data on a graph. See comparison worksheets These are a combination of real and imaginary numbers. You will be able to spot both distinct parts. See Complex Numbers We work on plotting sets of ordered pairs and making sense of their location. View Coordinate Graphing When we have a set group, this is the way we learn to order the set and create a system. View Counting The concept of base ten allows for a fun way to denote mathematical values. View Decimals Students will get an opportunity to with simple and long forms. View Division For times when you just need to have a general sense of the value. View Estimation This concept tells us how many times a value needs to be multiplied by itself based on the power it is raised to. View Exponents We look a two very different by directly related concepts in this section. View Factoring / Multiples We learn how to represent a part of a whole value. We understand how to break it into smaller portions. View Fractions One of the oldest forms of mathematics that explores size, shape, and the position of things. View Geometry These awesome graphical displays allow us to bring our data to life and help us make good decisions. View Graphing and Data This is one of those terms that are loosely thrown around, but often students do not fully understand it. View Integers These are values that you cannot write as a simple fraction. They are a bit crazy! View Irrational Numbers This is where geometry and algebra start to overlap a bit. We work with equations of the line. View Linear Equations These seem very complex, but it simply helps you determine how many times you must multiply a number to get a set value. View Logarithms In math we use this to determine the validity of a math statement or sentence. View Logic We learn how to use and manipulate an array of numbers. View Matrices We use a variety of tools and techniques to learn to quantify something so that we can understand it better. View Measurement Introduced to the world in the late seventeenth century, this system of measurement is used by most of the world today. View Metric System We start by counting it and then we see how they can be applied to complex systems. View Money It is time to really see what we can do with the form of addition on Mountain Dew. View Multiplication We learn which math operation you should use at what time when you are confronted with multiple operations to process. View Order of Operations Students learn how to breakdown a system and determine which rules are followed to produce it. View Patterns, Sequences The is a ratio of a whole or full value expressed as a fraction of 100. View Percentages We begin to look at the specific value of digits that are found within values. View Place Value We explore these many termed expressions. Students learn how to manipulate the constants, variables, and exponents that they are composed of. View Polynomials This is a later High School subject that is making sure you are ready for advanced college math. View Pre-Calculus What is the likelihood that something will take place under the given conditions? View Probability When graphed, they make nice curves. We break down the anatomy of these types of equations and learn to manipulate them. View Quadratic Equations These are often thought as one in the same, but they are not. View Ratios & Proportions We learn how to form values into an approximate value. View Rounding A very helpful way to name values that are either very large or very small. View Scientific Notation We look at the simple geometric uses of shapes and help give them more meaning to you. View Shapes This is a varied series of ways we approach data to help us make better and more informed decisions. View Statistics We learn to find the difference between many different types of values. View Subtraction We learn how to make sense of all types of things that are related to time. View Time Math A subject area that is completely obsessed with right triangles. View Trigonometry Students will explore problems that are presented as a story and relate to all different applications of math. View Word Problems Page 2 In grades 3 through 5, math concepts have a very broad range of mathematics topics. However, these are the math concepts that students should understand by the end of the fifth grade based on the National Council of Teachers of Mathematics standards. When it comes to Numbers and Operations concepts these are the concepts that students study. They learn place values using the base ten system as represented in whole numbers and decimals. Students recognize parts of fractions as units of whole numbers, along with finding locations on number lines. They use common fractions, decimals and percents in models and other forms in whole numbers. Students learn to locate and plot numbers less than 0 on a number line using negative whole numbers, fractions, decimals, and percents. They use addition and multiplication in problem solving situations that involve reciprocal functions in subtraction and division. Other mathematical operations include the distributive laws in multiplication and addition. They be able to mentally compute multiplication and division problems, such as 20 x 40. Students develop fluency in arithmetic computations in whole numbers and fractions. They learn to estimate using mental computations, along with using calculators and pencil/paper. In the area of Geometry concepts they learn to classify and develop an understanding of two and three dimensional objects, such as: squares, rectangles, cones, spheres, cylinders, etc. They also study the polygons as they relate to lines that are parallel and perpendicular. Additional areas of geometry and shapes will be the focus on transformations and symmetry of shapes as they are flipped, rotated, and turned. Further explorations are in the development tessellations, congruence, and similarities of geometric shapes. They learn to make connections of geometric shapes Third through fifth grade students also learn how to construct geometric shapes to find the area and volume of objects, using mathematical formulas. These include squares, prisms, rectangles, cones, circles, spheres, cylinders, etc. They also spend time learning how to apply geometric shapes to real world applications, along with connections to of content subject areas. Additional concepts in this area that students will explore are the distance between given points on a straight line, along with points on horizontal and vertical lines. In the mathematical concept area of Algebra students develop representations of patterns and functions using words, tables, graphs, and models. They explore and computer whole numbers using the commutative, associative, and distributive properties. In addition, they learn to apply variables to mathematical problems to the second variable level. They begin to develop an understanding of expressions and equations. The concept area of Measurement is focused on the using standard and non-standard units of measurement to determine the relationships between different objects. This also be connected with geometry as they learn how to measure the area, volume, and mass of different geometric shapes. They learn how to measure all aspects of circles, prisms, and pyramids. Students apply measurement applications to length, mass, volume, size, and angles of different objects to using formal and informal units of measure. Students explore the concepts of the metric system as they learn to convert U.S. customary units of measurement into the metric system. They learn to apply estimation skills for determining the shape, volume, area, and mass of different objects. In the concept area of Data Analysis and Probability, students use appropriate language to explain their findings in experiments and simulations. They learn how to develop questions that will help them find the differences between tow samples in a population. Students use data on tables to plot the data on line plots, bar graphs, and line graphs. This will then be used to draw conclusions and predictions from data that was collected in observations, experiments, and surveys. They develop mathematical theories for explaining events that will result in a likely or unlikely outcome. They interpret data that is represented on graphical plots to make predictions of likely outcomes. When it comes to Problem Solving, students develop problem solving strategies to help them develop a fundamental understanding of mathematics. Students use word problems and other real world simulations in problems solving situations. In the concept are of Representation, students will learn to collect and organize data. Then use the data to solve problems. Answers are presented as models that are physical and social. They are able to draw graphs, charts, tables, and other forms to explain how they solved a problem. For Connection concepts students learn to make connections to real world applications and other subject content areas. This includes making connections with other concepts in mathematics. Students learn to Communicate their mathematics ideas in the form of sentences, drawings, posters, and multimedia applications. This be used to ascertain their level of understanding as they explain mathematical concepts to other students and teachers. Students use logical Reasoning and Proof to explain their mathematical findings and problem solving techniques. All of these mathematical concepts are used to develop a well rounded base knowledge of mathematical ideas and language as students' progress to higher levels of mathematics. Page 3 They learn a broad range of mathematics topics. These are the math concepts that students must understand by the end of the 8th grade. All of these mathematical concepts are used to develop a well rounded base knowledge of mathematical ideas and language as students' progress to higher levels of mathematics. What do students in grade 6 through grade 8 learn in math? They learn a broad range of mathematics topics. These are the math concepts that students must understand by the end of the 8th grade based on the National Mathematics standards. Numbers and Operations concepts students study include understanding numbers, number relationships, and number systems. Students need to understand fractions, decimals, and percents and the relationship of their location on a number line. This includes understanding quantitative relationships of ratios and proportions of numbers. Using factors, multiples, prime numbers, and relative prime numbers to solve math problems. Students study the uses associative and commutative properties in addition and multiplication. This includes developing an understanding of inverse relationships in addition, subtraction, multiplication, and division. Also they learn the relationships squaring and finding the square roots of numbers. They develop and analyze algorithms for computing fractions, decimals, and integers as applied to problem solving situations. Algebra focuses on the concepts to represent, analyze, and general a variety of patterns as they relate to symbolic rules. They interpret data on as either linear or non-linear when transferred from data tables to graphs or equations. They learn to use symbolic algebra to represent situations found in algebraic expressions and equations. They learn to use graphing calculators to analyze expressions and equations, along with traditional computational tools. Geometry concepts focus analyzing the characteristics of two and three dimensional objects to find their angles, side lengths, perimeters, areas, and more. They use coordinate geometry to examine special objects such as polygons, and objects with parallel and perpendicular lines. They also analyze the relationships in objects as to congruence, similarity, and the Pythagorean Theorem. They also describe transformations of objects by similarity and rotation. Finally they use geometric patterns to solve problems. Measurement concepts focus on using customary standard and non-standard units of measurement and determine the relationships between varieties of objects. This is also connected with geometry as they learn how to measure the area, volume, and mass of different geometric shapes. They learn how to measure all aspects of circles, prisms, and pyramids. Students apply measurement applications to the conversion of U.S. customary units of measurement into the metric system. They develop a basic understanding of meter, liter, and grams; including their variables. They learn to apply estimation skills for determining the shape, volume, area, and mass of different objects. Data Analysis and Probability concepts focus on using appropriate language to explain findings in mathematical experiments and simulations. They learn how to develop questions that help find the differences between two or more samples in a population. They develop mathematical theories for explaining events that will result in likely or unlikely outcomes. They interpret data that are represented on graphical plots to make predictions of likely outcomes. Problem Solving for eighth grade students focuses the development of problem solving strategies to help them develop a fundamental understanding of mathematics. Students use word problems and other real world simulations in problems solving situations. Representation concepts focus on students learning to collect and organize data, then using the data to solve problems. Answers are presented as models that are numerical, written, physical, and social. They are able to draw graphs, charts, tables, and other forms to explain how they solved a problem. Connection concepts are designed for eighth grade students to demonstrate how to make connections to real world applications and other subject content areas. This includes making connections with other concepts in mathematics. Communicate their mathematics ideas in the form of sentences, drawings, posters, and multimedia applications is another concept that students need to master. This is used to ascertain their level of understanding as they explain mathematical concepts to other students and teachers. Reasoning and Proof concepts are used to explain mathematical findings and problem solving techniques. This is necessary so that they develop skills on how to present logical arguments to math situations. All of these mathematical concepts are used to develop a well rounded base knowledge of mathematical ideas and language as students' progress to higher levels of mathematics. Your browser does not support HTML5 canvas. Fractions on a Number Line Here we will explain what a number line is and show you how to represent your fraction on a number line. We find this helpful when dealing with fractions, because it shows how small or large your fraction is in relation to other numbers or values. Please enter your fraction below to get started. Here are some examples of fractions we have represented on a number line. Copyright | Privacy Policy | Disclaimer | Contact Representing fractions on a number line means that we can plot fractions on a number line, which is similar to plotting whole numbers and integers. Fractions represent parts of a whole. So, fractions on the number line are represented by making equal parts of a whole i.e. 0 to 1, and the number of those equal parts would be the same as the number written in the denominator of the fraction. For example, to represent 1/8 on the number line, we have to divide 0 to 1 into 8 equal parts and mark the first part as 1/8. How to Plot Fractions on Number Line? To plot fractions on the number line, follow the steps given below: Step 1: Draw a number line of a suitable length. Step 2: If the given fraction is a proper fraction, then mark points 0 and 1 on the number line. Or, if it is an improper fraction, then first convert it into a mixed fraction, and then mark two integers between those the given fraction lies. For example, to represent 3/2 or \(1 \dfrac{1}{2}\), mark points 1 and 2 on the number line. Step 3: Draw an equal number of parts of the numbers marked in step 2 which will be equal to the denominator of the fraction. Step 4: Starting from the left point, count forward the number of parts shown by the numerator. Step 5: Mark the point on the line. An example of 3/7 is shown in the image below to help you understand how to plot fractions on a number line step-wise. Comparing Fractions on Number Line It is easy to compare fractions on a number line. The number line represents values in ascending order from left to right. It means that the fraction which is marked on the left side is lesser than the fraction on its right. For example, in the image below, it is clear that 1/5denominator, then we can first convert an improper fraction to a mixed number, and then represent it on the number line using the same procedure as discussed above. Fractions on a Number Line Worksheet PDFs Download fractions on a number line worksheets with answers to practice questions on this topic. Related Topics Check these interesting articles related to the concept of fractions on a number line. Example 1: State whether 1/4 and 2/6 are equivalent fractions or not by using a number line. Solution: By using the concept of fractions on the number line, we can easily plot these two fractions on the number line as shown below: As, it is clear that the positions of 1/4 and 2/6 are not the same, as 1/4 go to slidego to slidego to slide Great learning in high school using simple cues Indulging in rote learning, you are likely to forget concepts. With Cuemath, you will learn visually and be surprised by the outcomes. Book a Free Trial Class FAQs on Fractions on Number Line Fraction on a number line is a visual mathematical representation of fractions. It is done by plotting the given fraction(s) on the number line where the section or the distance between two integers is divided into equal parts which are equal to the denominator of the given fraction. It is useful to add/subtract or to compare fractions visually. How to Represent Fractions on Number Line? Fractions can be represented on a number line by following these simple steps: Step 1: Draw a number line and mark two integers between which the fraction lies. Step 2: Divide the section between the two integers in an equal number of parts which is equal to the denominator. Step 3: Start from the integer on the left side and make as many jumps as the number written in the numerator of the fraction. Step 4: Mark that point with a color or a circle and write the fraction beside it. What are Equivalent Fractions on a Number Line? Equivalent fractions on a number line are those fractions that share the same position irrespective of the numbers written in their numerators and denominators. They are equal in value. How to Order Fractions on a Number Line? Fractions that lie on the left side are smaller than the ones that are on their right side. To order fractions on a number line, the fraction written on the leftmost side is the smallest, the fraction written on the rightmost side is the largest fraction, and all other fractions will lie between these two depending on their position from left to right. How to Add Fractions on Number Line? We can easily add like fractions on the number line by plotting any one fraction first, and then take as many jumps to the right as the numerator of the second fraction. For example, to add 3/4 and 5/4, we can first plot 5/4 on the number line, and then take three jumps to the right. We will reach at 8/4 or 2 and that is the required answer because 3/4 + 5/4 = 8/4 = 2. See Equivalent Fractions and where they fit on the Number Line images/frac-number-line.js Move your mouse left and right, and explore the different fractions. Click on the number line to "mark" a position. Equivalent Fractions An example of Equivalent Fractions: 14 is the same as 28 , 312 and 416 (Use the Fraction Number Line to see why) Can you find other Equivalent Fractions ? Which is Larger? You can also Use the Fraction Number Line to find which fractions are smaller or larger (smaller ones are closer to zero). Which fraction is larger in each of these pairs? 27 or 13 ? 1 2 or 5 9 ? 6 7 or 4 5 ? 1 5 or 1 7 ? 3 4 or 5 6 ? 6 11 or 7 15 ? Copyright © 2024 Rod Pierce Subscribe to our YouTube channel for the latest videos, updates, and tips. Representing fractions on number line shows the intervals between two integers which will help us to increase the basic concept on formation of fractional numbers. 1. Represent the fractions: 2/5, 11/5, -8/5 and -3/5 on a number line.Since, the denominator of each given fraction is 5; divide the space between every pair of two consecutive integers (on the number line) in 5 equal parts. Each part so obtained will represent the fraction 1/5 and the number line obtained will be of the form: To mark 2/5; move two parts on the right-side of zero.To mark 11/5; move eleven parts on the right-side of zero.To mark -8/5; move eight parts on the left-side of zero.To mark -3/5; move three parts on the left-side of zero. The following diagram shows markings of fractions 2/5, 11/5, -8/5 and -3/5 on a number line. 2. Represent the following fractions: 1/4, 7/4, -3/4 and -9/4 on a number line.Since, the denominator of each given fraction is 4; divide the space between every pairs of two consecutive integers (on the number line) in 4 equal parts. Each part so obtained will represent the fraction 1/4 and the number line obtained will be of the form: To mark 1/4; move one part on the right-side of zero.To mark 7/4; move seven parts on the right-side of zero. To mark -3/4; move three parts on the left-side of zero. To mark -9/4; move nine parts on the left-side of zero. The following diagram shows markings of fractions 1/4, 7/4, -3/4 and -9/4 on a number line. 3. Draw a number line to represent fractions: 3/8, 5/8, -1 3/8, -7/8Since, the denominator of each given fraction is 8; divide the space between every pairs of two consecutive integers (on the number line) in 8 equal parts. Each part so obtained will represent the fraction 1/8 and the number line obtained will be of the form: To mark 3/8; move three parts on the right-side of zero.To mark 5/8; move five parts on the right-side of zero. To mark -1 3/8 i.e. -11/8; move eleven parts on the left-side of zero. To mark -7/8; move seven parts on the left-side of zero. The following diagram shows markings of fractions 3/8, 5/8, -1 3/8, -7/8 on a number line. So, in representing fractions on number line we have learnt how to draw any fractional points on the number line. 6th Grade Math PracticeFrom Representing Fractions on Number Line to HOME PAGE Didn't find what you were looking for? Or want to know more information about Math Only Math. Use this Google Search to find what you need. Share this page: What's this? Line formed by the real numbers This article is about the mathematical concept. For the typesetting practice, see Printer's key. The order of the natural numbers shown on the number line A number line is a graphical representation of a straight line that serves as spatial representation of numbers, usually graduated like a ruler with a particular origin point representing the number zero and evenly spaced marks in either direction representing integers, imagined to extend infinitely. The association between numbers and points on the line links arithmetical operations on numbers to geometric relations between points, and provides a conceptual framework for learning mathematics. In elementary mathematics, the number line is initially used to teach addition and subtraction of integers, especially involving negative numbers. As students progress, more kinds of numbers can be placed on the line, including fractions, decimal fractions, square roots, and transcendental numbers such as the circle constant π: Every point of the number line corresponds to a unique real number, and every real number to a unique point.[1] Using a number line, numerical concepts can be interpreted geometrically and geometric concepts interpreted numerically. An inequality between numbers corresponds to a left-or-right order relation between points. Numerical intervals are associated to geometrical segments of the line. Operations and functions on numbers correspond to geometric transformations of the line. Wrapping the line into a circle relates modular arithmetic to the geometric composition of angles. Marking the line with logarithmically spaced graduations associates multiplication and division with geometric translations, the principle underlying the slide rule. In analytic geometry, coordinate axes are number lines which associate points in a geometric space with tuples of numbers, so geometric shapes can be described using numerical equations and numerical functions can be graphed. In advanced mathematics, the number line is usually called the real line or real number line, and is a geometric line isomorphic to the set of real numbers, with which it is often conflated; both the real numbers and the real line are commonly denoted R or R {\displaystyle \mathbb {R} } . The real line is a one-dimensional real coordinate space, so is sometimes denoted R1 when comparing it to higher-dimensional spaces. The real line is a one-dimensional Euclidean space using the difference between numbers to define the distance between points on the line. It can also be thought of as a vector space, a metric space, a topological space, a measure space, or a linear continuum. The real line can be embedded in the complex plane, used as a two-dimensional geometric representation of the complex numbers. The first mention of the number line used for operation purposes is found in John Wallis's Treatise of Algebra (1685).[2] In his treatise, Wallis describes addition and subtraction on a number line in terms of moving forward and backward, under the metaphor of a person walking. An earlier depiction without mention to operations, though, is found in John Napier's A Description of the Admirable Table of Logarithmes (1616), which shows values 1 through 12 lined up from left to right.[3] Contrary to popular belief, René Descartes's original La Géométrie does not feature a number line, defined as we use it today, though it does use a coordinate system. In particular, Descartes's work does not contain specific numbers mapped onto lines, only abstract quantities.[4] A number line is usually represented as being horizontal, but in a Cartesian coordinate plane the vertical axis (y-axis) is also a number line.[5] The arrow on the line indicates the positive direction in which numbers increase.[5] Some textbooks attach an arrow to both sides, suggesting that the arrow indicates continuation. This is unnecessary, since according to the rules of geometry a line without endpoints continues indefinitely in the positive and negative directions. A line with one endpoint as a ray, and a line with two endpoints as a line segment. If a particular number is farther to the right on the number line than is another number, then the first number is greater than the second (equivalently, the second is less than the first). The distance between them is the magnitude of their difference—that is, it measures the first number minus the second one, or equivalently the absolute value of the second number minus the first one. Taking this difference is the process of subtraction. Thus, for example, the length of a line segment between 0 and some other number represents the magnitude of the latter number. Two numbers can be added by "picking up" the length from 0 to one of the numbers, and putting it down again with the end that was 0 placed on top of the other number. Two numbers can be multiplied as in this example: To multiply 5 × 3, note that this is the same as 5 + 5 + 5, so pick up the length from 0 to 5 and place it to the right of 5, and then pick up that length again and place it to the right of the previous result. This gives a result that is 3 combined lengths of 5 each; since the process ends at 15, we find that 5 × 3 = 15. Division can be performed as in the following example: To divide 6 by 2—that is, to find out how many times 2 goes into 6—note that the length from 0 to 2 lies at the beginning of the length from 0 to 6; pick up the former length and put it down again to the right of its original position, with the end formerly at 0 now placed at 2, and then move the length to the right of its latest position again. This puts the right end of the length 2 at the right end of the length from 0 to 6. Since three lengths of 2 filled the length 6, 2 goes into 6 three times (that is, 6 ÷ 2 = 3). The ordering on the number line: Greater elements are in direction of the arrow. The difference 3−2=3+(−2) on the real number line The addition 1+2 on the real number line The absolute difference. The multiplication 2×1.5 on the real number line The division 3÷2 on the real number line The closed interval [a,b]. The section of the number line between two numbers is called an interval. If the section includes both numbers it is said to be a closed interval, while if it excludes both numbers it is called an open interval. If it includes one of the numbers but not the other one, it is called a half-open interval. All the points extending forever in one direction from a particular point are together known as a ray. If the ray includes the particular point, it is a closed ray; otherwise it is an open ray. Main article: Logarithmic scale A log-log plot of y = x (blue), y = x2 (green), and y = x3 (red).Note the logarithmic scale markings on each of the axes, and that the log x and log y axes (where the logarithms are 0) are where x and y themselves are 1. On the number line, the distance between two points is the unit length if and only if the difference of the represented numbers equals 1. Other choices are possible. One of the most common choices is the logarithmic scale, which is a representation of the positive numbers on a line, such that the distance of two points is the unit length, if the ratio of the represented numbers has a fixed value, typically 10. In such a logarithmic scale, the origin represents 1; one inch to the right, one has 10, one inch to the right of 10 one has 10×10 = 100, then 10×100 = 1000 = 103, then 10×1000 = 10,000 = 104, etc. Similarly, one inch to the left of 1, one has 1/10 = 10–1, then 1/100 = 10–2, etc. This approach is useful, when one wants to represent, on the same figure, values with very different order of magnitude. For example, one requires a logarithmic scale for representing simultaneously the size of the different bodies that exist in the Universe, typically, a photon, an electron, an atom, a molecule, a human, the Earth, the Solar System, a galaxy, and the visible Universe. Logarithmic scales are used in slide rules for multiplying or dividing numbers by adding or subtracting lengths on logarithmic scales. The two logarithmic scales of a slide rule A line drawn through the origin at right angles to the real number line can be used to represent the imaginary numbers. This line, called imaginary line, extends the number line to a complex number plane, with points representing complex numbers. Alternatively, one real number line can be drawn horizontally to denote possible values of one real number, commonly called x, and another real number line can be drawn vertically to denote possible values of another real number, commonly called y. Together these lines form what is known as a Cartesian coordinate system, and any point in the plane represents the value of a pair of real numbers. Further, the Cartesian coordinate system can itself be extended by visualizing a third number line "coming out of the screen (or page)", measuring a third variable called z. Positive numbers are closer to the viewer's eyes than the screen is, while negative numbers are "behind the screen"; larger numbers are farther from the screen. Then any point in the three-dimensional space that we live in represents the values of a trio of real numbers. Each set on the real line has a supremum. The real line is a linear continuum under the standard < ordering. Specifically, the real line is linearly ordered by 0, then the ε-ball in R centered at p is simply the open interval (p − ε, p + ε). This point the real line has several important properties as a metric space: The real line is a complete metric space, in the sense that any Cauchy sequence of points converges. The real line is path-connected and is one of the simplest examples of a geodesic metric space. The Hausdorff dimension of the real line is equal to one. The real line can be compactified by adding a point at infinity. The real line carries a standard topology, which can be introduced in two different, equivalent ways. First, since the real numbers are totally ordered, they carry an order topology. Second, the real numbers inherit a metric topology from the metric defined above. The order topology and metric topology on R are the same. As a topological space, the real line is homeomorphic to the open interval (0, 1). The real line is trivially a topological manifold of dimension 1. Up to homeomorphism, it is one of only two different connected 1-manifolds without boundary, the other being the circle. It also has a standard differentiable structure on it, making it a differentiable manifold. (Up to diffeomorphism, there is only one differentiable structure that the topological space supports.) The real line is a locally compact space and a paracompact space, as well as second-countable and normal. It is also path-connected, and is therefore connected as well, though it can be disconnected by removing any one point. The real line is also contractible, and as such all of its homotopy groups and reduced homology groups are zero. As a locally compact space, the real line can be compactified in several different ways. The one-point compactification of R is a circle (namely, the real projective line), and the extra point can be thought of as an unsigned infinity. Alternatively, the real line has two ends, and the resulting end compactification is the extended real line [−∞, +∞]. There is also the Stone–Čech compactification of the real line, which involves adding an infinite number of additional points. In some contexts, it is helpful to place other topologies on the set of real numbers, such as the lower limit topology or the Zariski topology. For the real numbers, the latter is the same as the finite complement topology. The bijection between points on the real line and vectors The real line is a vector space over the field R of real numbers (that is, over itself) of dimension 1. It has the usual multiplication as an inner product, making it a Euclidean vector space. The norm defined by this inner product is simply the absolute value. The real line carries a canonical measure, namely the Lebesgue measure. This measure can be defined as the completion of a Borel measure defined on R, where the measure of any interval is the length of the interval. Lebesgue measure on the real line is one of the simplest examples of a Haar measure on a locally compact group. When A is a unital real algebra, the products of real numbers with 1 is a real line within the algebra. For example, in the complex plane z = x + iy, the subspace {z : y = 0} is a real line. Similarly, the algebra of quaternions q = w + x i + y j + z k has a real line in the subspace {q : x = y = z = 0}. When the real algebra is a direct sum A = R ⊕ V , {\displaystyle A=R\oplus V,} then a conjugation on A is introduced by the mapping v → − v {\displaystyle v\to -v} of subspace V. In this way the real line consists of the fixed points of the conjugation. For a dimension n, the square matrices form a ring that has a real line in the form of real products with the identity matrix in the ring. Cantor–Dedekind axiom Chronology Cuisenaire rods Extended real number line Hyperreal number line Imaginary line (mathematics) Line (geometry) Number form (neurological phenomenon) One-dimensional space Projectively extended real line ^ Stewart, James B.; Redlin, Lothar; Watson, Saleem (2008). College Algebra (5th ed.). Brooks Cole. pp. 13–19. ISBN 978-0-495-56521-5. ^ Wallis, John (1685). Treatise of Algebra, p. 265. ^ Napier, John (1616). A Description of the Admirable Table of Logarithmes ^ Núñez, Rafael (2017). "How Much Mathematics Is 'Hardwired', If Any at All: Biological Evolution, Development, and the Essential Role of Culture". Maria D. Sera, Michael Maratsos and Stephanie M. Carlson (2017). Minnesota Symposia on Child Psychology: Culture and Developmental Systems, Volume 38: Culture and Developmental Systems. Hoboken, NJ: John Wiley & Sons. p. 98. ISBN 9781119247654. OCLC 961910599. ^ a b Introduction to the x,y-plane (Archived 2015-11-09 at the Wayback Machine" "Purplemath" Retrieved 2015-11-13. Munkres, James (1999). Topology (2nd ed.). Prentice Hall. ISBN 0-13-181629-2. Rudin, Walter (1966). Real and Complex Analysis. McGraw-Hill. ISBN 0-07-100276-6. Media related to Number lines at Wikimedia Commons Retrieved from " Graphing fractions on a number line helps us represent and compare fractions, like plotting whole numbers and integers. Fractions represent a part of a whole. For representing a fraction on a number line, its two immediate whole numbers are marked at both ends. The total distance is divided into a total number of equal parts according to the value of the denominator. The numerator represents this distance from 0. For example, in the fraction ${\dfrac{1}{3}}$, the numerator is 1, and the denominator is a 3. As we know that 0 < ${\dfrac{1}{3}}$ < 1, to put ${\dfrac{1}{3}}$ on a number line, we divide the region from 0 to 1 into 3 equal parts as the denominator is 3. Then, we move towards the right, starting from 0 based on the value of the numerator (here, 1). So we mark the 1st part starting from 0 as ${\dfrac{1}{3}}$. Fractions on a Number Line 0 1 Here, ${\dfrac{1}{3}}$ is a unit fraction as it has 1 as its numerator. As we know, while representing fractions on a number line, it appears between two integers. Thus, positive fractions lie at the right of 0 and between two positive integers, while the negative ones lie at the left of 0 and between two negative integers on a number line. Number Line Positive and Negative Fractions The above figure divides the region between each pair of successive integers into two equal parts. The positive fractions ${\dfrac{1}{2}}$, ${\dfrac{3}{2}}$ are found to the right of 0, while the negative fractions ${-\dfrac{1}{2}}$, ${-\dfrac{3}{2}}$ lie to the left of 0. We can represent different types of fractions on a number line. We can plot positive and negative proper fractions easily on a number line. As a proper fraction has its numerator always less than the denominator (comparing only the numeric values of the numerator and the denominator), a positive proper fraction always lies between 0 and 1 on a number line. Similarly, a negative proper fraction lies between (-1) and 0. In the first diagram, we have shown plotting a positive proper fraction. Similarly, we can represent a negative proper fraction on a number line by marking the points (-1) and 0 and dividing the region into equal parts based on the denominator. Then we move from right to left, starting from 0 according to the numerator. For example, to show ${-\dfrac{5}{6}}$ on a number line, we mark the points (-1) and 0 on a number line. Number Line Negative Proper Fraction Step 1 Then we divide the region from (-1) to 0 into 6 equal parts as the denominator is 6. Each part represents ${-\dfrac{1}{6}}$. Number Line Negative Proper Fraction Step 2 Next, we move from right to left starting from 0 up to the 5th part as the numerator is 5 and mark it as ${-\dfrac{5}{6}}$ Number Line Negative Proper Fraction Step 3 Equivalent fractions are located at the same point on a number line because they represent the same value when it is reduced to its simplest form despite having different denominators and numerators. Let us represent the equivalent fractions ${\dfrac{1}{3}}$, ${\dfrac{2}{6}}$, ${\dfrac{3}{9}}$ on a number line: To plot ${\dfrac{1}{3}}$, we divide the region from 0 to 1 into 3 equal parts and mark the first part as ${\dfrac{1}{3}}$ To plot${\dfrac{2}{6}}$, we divide the region from 0 to 1 into 6 equal parts and mark the second part as ${\dfrac{2}{6}}$ Similarly to plot ${\dfrac{3}{9}}$, we divide the region from 0 to 1 into 9 equal parts and mark the third part as ${\dfrac{3}{9}}$ Equivalent Fractions on a Number Line To represent a mixed fraction on a number line, we first identify its integer and proper fraction parts separately. Next, we mark those two integers on the number line between which the mixed fraction lies and move the number of steps right or left according to the proper fraction part. Let us represent the mixed fraction ${4\dfrac{2}{5}}$ on the number line. We get the fraction ${4\dfrac{2}{5}}$ by adding its integer part 4 and the proper fraction part ${\dfrac{2}{5}}$. To represent ${4\dfrac{2}{5}}$ on a number line, we first mark 4 and 5 on the number line as the integer part is 4 and ${4\dfrac{2}{5}}$ lies between 4 and 5. Number Line Mixed Fraction Step 1 Next, we divide the above line segment into 5 equal parts, each representing ${\dfrac{1}{5}}$ and go to the proper fractional part (here${\dfrac{2}{5}}$) starting from 4. Number Line Mixed Fraction Step 2 Thus we find the point representing ${4\dfrac{2}{5}}$ on the number line. Representing improper fractions (positive and negative) on a number line is similar to graphing proper fractions. Positive improper fractions are always greater than 1 and lie between 1 and a positive integer. Similarly, negative improper fractions being less than (-1), lie between (-1) and a negative integer. We can represent improper fractions on a number line by converting them into a mixed fraction and following the same procedure as above. For example, to plot ${\dfrac{3}{2}}$ on a number line, we first convert it into a mixed fraction ${\dfrac{3}{2}}$ = ${1\dfrac{1}{2}}$ Then, we mark 1 and 2 on the number line as the integer part is 1. As we know, ${\dfrac{3}{2}}$ lies between 1 and 2; we divide the region from 1 to 2 into two equal parts, each representing ${\dfrac{1}{2}}$ and move towards the proper fraction, here ${\dfrac{1}{2}}$. Fraction on a Number Line Thus we find ${\dfrac{3}{2}}$ on a number line. Represent the fraction ${-8\dfrac{4}{7}}$ on the number line. Solution:To represent ${-8\dfrac{4}{7}}$ on the number line, we follow the given steps:In the fraction ${-8\dfrac{4}{7}}$, the integer part is (-8) and the proper fraction part is ${-\dfrac{4}{7}}$. As ${-8\dfrac{4}{7}}$ lies between the integers (-8) and (-9), we divide the region from (-8) to (-9) in 7 equal parts and mark the 4th part starting from (-8).Thus we get ${-8\dfrac{4}{7}}$ on the number line. Locate ${-\dfrac{9}{4}}$ on a number line.Solution:We first convert the improper fraction ${-\dfrac{9}{4}}$ into a mixed fraction.Again, ${-\dfrac{9}{4}}$ = ${-2\dfrac{1}{4}}$Since ${-2\dfrac{1}{4}}$ lies between (-2) and (-3). Next we divide the region from (-2) to (-3) into 4 equal parts each representing ${-\left(\dfrac{1}{4}\right)}$ and go to the 1st part starting from (-2) to get the answer.Thus we find ${-\dfrac{9}{4}}$ on the number line.We have provided a printable fraction number line chart from 0 to 1 for your use. We have provided a printable fraction number line chart from 0 to 1 for your use. Fraction Number Line Chart 0 to 1 Last modified on August 22nd, 2024