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Equation that does not involve powers or products of variables Not to be confused with Linear differential equation. Two graphs of linear equations in two variables In mathematics, a linear equation is an equation that may be put in the form a 1 x 1 + … + a n x n + b = 0 , {\displaystyle a_{1}x_{1}+\ldots +a_{n}x_{n}+b=0,} where x 1 , … , x n {\displaystyle x_{1},\ldots ,x_{n}} are the variables (or unknowns), and b , a 1 , … , a n {\displaystyle b,a_{1},\ldots ,a_{n}} are the coefficients, which are often real numbers. The coefficients may be considered as parameters of the equation and may be arbitrary expressions, provided they do not contain any of the variables. To yield a meaningful equation, the coefficients a 1 , … , a n {\displaystyle a_{1},\ldots ,a_{n}} are required to not all be zero. Alternatively, a linear equation can be obtained by equating to zero a linear polynomial over some field, from which the coefficients are taken. The solutions of such an equation are the values that, when substituted for the unknowns, make the equality true. In the case of just one variable, there is exactly one solution (provided that a 1 ≠ 0 {\displaystyle a_{1}eq 0}). Often, the term linear equation refers implicitly to this particular case, in which the variable is sensibly called the unknown. In the case of two variables, each solution may be interpreted as the Cartesian coordinates of a point of the Euclidean plane. The solutions of a linear equation form a line in the Euclidean plane, and, conversely, every line can be viewed as the set of all solutions of a linear equation in two variables. This is the origin of the term linear for describing this type of equation. More generally, the solutions of a linear equation in n variables form a hyperplane (a subspace of dimension n − 1) in the Euclidean space of dimension n. Linear equations occur frequently in all mathematics and their applications in physics and engineering, partly because non-linear systems are often well approximated by linear equations. This article considers the case of a single equation with coefficients from the field of real numbers, for which one studies the real solutions. All of its content applies to complex solutions and, more generally, to linear equations with coefficients and solutions in any field. For the case of several simultaneous linear equations, see system of linear equations. A linear equation in one variable x can be written as a x + b = 0 , {\displaystyle ax+b=0,} with a ≠ 0 {\displaystyle aeq 0} . The solution is x = − b a {\displaystyle x=-{\frac {b}{a}}} . A linear equation in two variables x and y can be written as a x + b y + c = 0 , {\displaystyle ax+by+c=0,} where a and b are not both 0.[1] If a and b are real numbers, it has infinitely many solutions. Main article: Linear function (calculus) If b ≠ 0, the equation a x + b y + c = 0 {\displaystyle ax+by+c=0} is a linear equation in the single variable y for every value of x. It therefore has a unique solution for y, which is given by y = − a b x − c b . {\displaystyle y=-{\frac {a}{b}}x-{\frac {c}{b}}.} This defines a function. The graph of this function is a line with slope − a b {\displaystyle -{\frac {a}{b}}} and y-intercept − c b . {\displaystyle -{\frac {c}{b}}.} The functions whose graph is a line are generally called linear functions in the context of calculus. However, in linear algebra, a linear function is a function that maps a sum to the sum of the images of the summands. So, for this definition, the above function is linear only when c = 0, that is when the line passes through the origin. To avoid confusion, the functions whose graph is an arbitrary line are often called affine functions, and the linear functions such that c = 0 are often called linear maps. Vertical line of equation x = a Horizontal line of equation y = b Each solution (x, y) of a linear equation a x + b y + c = 0 {\displaystyle ax+by+c=0} may be viewed as the Cartesian coordinates of a point in the Euclidean plane. With this interpretation, all solutions of the equation form a line, provided that a and b are not both zero. Conversely, every line is the set of all solutions of a linear equation. The phrase "linear equation" takes its origin in this correspondence between lines and equations: a linear equation in two variables is an equation whose solutions form a line. If b ≠ 0, the line is the graph of the function of x that has been defined in the preceding section. If b = 0, the line is a vertical line (that is a line parallel to the y-axis) of equation x = − c a , {\displaystyle x=-{\frac {c}{a}},} which is not the graph of a function of x. Similarly, if a ≠ 0, the line is the graph of a function of y, and, if a = 0, one has a horizontal line of equation y = − c b . {\displaystyle y=-{\frac {c}{b}}.} There are various ways of defining a line. In the following subsections, a linear equation of the line is given in each case. A non-vertical line can be defined by its slope m, and its y-intercept y0 (the y coordinate of its intersection with the y-axis). In this case, its linear equation can be written y = m x + y 0 . {\displaystyle y=mx+y_{0}.} If, moreover, the line is not horizontal, it can be defined by its slope and its x-intercept x0. In this case, its equation can be written y = m (x − x 0) , {\displaystyle y=m(x-x_{0}),} or, equivalently, y = m x − m x 0 . {\displaystyle y=mx-mx_{0}.} These forms rely on the habit of considering a nonvertical line as the graph of a function.[2] For a line given by an equation a x + b y + c = 0 , {\displaystyle ax+by+c=0,} these forms can be easily deduced from the relations m = − a b , x 0 = − c a , y 0 = − c b . {\displaystyle {\begin{aligned}m&=-{\frac {a}{b}},\\x_{0}&=-{\frac {c}{a}},\\y_{0}&=-{\frac {c}{b}}.\end{aligned}}} A non-vertical line can be defined by its slope m, and the coordinates x 1 , y 1 {\displaystyle x_{1},y_{1}} of any point of the line. In this case, a linear equation of the line is y = y 1 + m (x − x 1) , {\displaystyle y=y_{1}+m(x-x_{1}),} or y = m x + y 1 − m x 1 . {\displaystyle y=mx+y_{1}-mx_{1}.} This equation can also be written y − y 1 = m (x − x 1) {\displaystyle y-y_{1}=m(x-x_{1})} to emphasize that the slope of a line can be computed from the coordinates of any two points. A line that is not parallel to an axis and does not pass through the origin cuts the axes into two different points. The intercept values x0 and y0 of these two points are nonzero, and an equation of the line is[3] x x 0 + y y 0 = 1. {\displaystyle {\frac {x}{x_{0}}}+{\frac {y}{y_{0}}}=1.} (It is easy to verify that the line defined by this equation has x0 and y0 as intercept values). Given two different points (x1, y1) and (x2, y2), there is exactly one line that passes through them. There are several ways to write a linear equation of this line. If x1 ≠ x2, the slope of the line is y 2 − y 1 x 2 − x 1 . {\displaystyle {\frac {y_{2}-y_{1}}{x_{2}-x_{1}}}.} Thus, a point-slope form is[3] y − y 1 = y 2 − y 1 x 2 − x 1 (x − x 1) . {\displaystyle y-y_{1}={\frac {y_{2}-y_{1}}{x_{2}-x_{1}}}(x-x_{1}).} By clearing denominators, one gets the equation (x 2 − x 1) (y − y 1) − (y 2 − y 1) (x − x 1) = 0 , {\displaystyle (x_{2}-x_{1})(y-y_{1})-(y_{2}-y_{1})(x-x_{1})=0,} which is valid also when x1 = x2 (to verify this, it suffices to verify that the two given points satisfy the equation). This form is not symmetric in the two given points, but a symmetric form can be obtained by regrouping the constant terms: (y 1 − y 2) x + (x 2 − x 1) y + (x 1 y 2 − x 2 y 1) = 0 {\displaystyle (y_{1}-y_{2})x+(x_{2}-x_{1})y+(x_{1}y_{2}-x_{2}y_{1})=0} (exchanging the two points changes the sign of the left-hand side of the equation). The two-point form of the equation of a line can be expressed simply in terms of a determinant. There are two common ways for that. The equation (x 2 − x 1) (y − y 1) − (y 2 − y 1) (x − x 1) = 0 {\displaystyle (x_{2}-x_{1})(y-y_{1})-(y_{2}-y_{1})(x-x_{1})=0} is the result of expanding the determinant in the equation | x − x 1 y − y 1 x 2 − x 1 y 2 − y 1 | = 0. {\displaystyle {\begin{vmatrix}x-x_{1}&y-y_{1}\\x_{2}-x_{1}&y_{2}-y_{1}\end{vmatrix}}=0.} The equation (y 1 − y 2) x + (x 2 − x 1) y + (x 1 y 2 − x 2 y 1) = 0 {\displaystyle (y_{1}-y_{2})x+(x_{2}-x_{1})y+(x_{1}y_{2}-x_{2}y_{1})=0} can be obtained by expanding with respect to its first row the determinant in the equation | x y 1 x 1 y 1 1 x 2 y 2 1 | = 0. {\displaystyle {\begin{vmatrix}x&y&1\\x_{1}&y_{1}&1\\x_{2}&y_{2}&1\end{vmatrix}}=0.} Besides being very simple and mnemonic, this form has the advantage of being a special case of the more general equation of a hyperplane passing through n points in a space of dimension n − 1. These equations rely on the condition of linear dependence of points in a projective space. A linear equation with more than two variables may always be assumed to have the form a 1 x 1 + a 2 x 2 + ⋯ + a n x n + b = 0. {\displaystyle a_{1}x_{1}+a_{2}x_{2}+\cdots +a_{n}x_{n}+b=0.} The coefficient b, often denoted a0 is called the constant term (sometimes the absolute term in old books[4][5]). Depending on the context, the term coefficient can be reserved for the ai with i > 0. When dealing with n = 3 {\displaystyle n=3} variables, it is common to use x , y {\displaystyle x,\;y} and z {\displaystyle z} instead of indexed variables. A solution of such an equation is a n-tuple such that substituting each element of the tuple for the corresponding variable transforms the equation into a true equality. For an equation to be meaningful, the coefficient of at least one variable must be non-zero. If every variable has a zero coefficient, then, as mentioned for one variable, the equation is either inconsistent (for b ≠ 0) as having no solution, or all n-tuples are solutions. The n-tuples that are solutions of a linear equation in n variables are the Cartesian coordinates of the points of an (n − 1)-dimensional hyperplane in an n-dimensional Euclidean space (or affine space if the coefficients are complex numbers or belong to any field). In the case of three variables, this hyperplane is a plane. If a linear equation is given with aj ≠ 0, then the equation can be solved for xj, yielding x j = − b a j − ∑ i ∈ { 1 , … , n } , i ≠ j a i a j x i . {\displaystyle x_{j}=-{\frac {b}{a_{j}}}-\sum _{i\in \{1,\ldots ,n\},ieq j}{\frac {a_{i}}{a_{j}}}x_{i}.} If the coefficients are real numbers, this defines a real-valued function of n real variables. Linear equation over a ring Algebraic equation Line coordinates Linear inequality Nonlinear equation ^ Barnett, Ziegler & Byleen 2008, pg. 15 ^ Larson & Hostetler 2007, p. 25 ^ a b Wilson & Tracey 1925, pp. 52-53 ^ Charles Hiram Chapman (1892). An Elementary Course in Theory of Equations. J. Wiley & sons. p. 17. Extract of page 17 ^ David Martin Sensenig (1890). Numbers Universalized: An Advanced Algebra. American Book Company. p. 113. Extract of page 113 Barnett, R.A.; Ziegler, M.R.; Byleen, K.E. (2008), College Mathematics for Business, Economics, Life Sciences and the Social Sciences (11th ed.), Upper Saddle River, N.J.: Pearson, ISBN 978-0-13-157225-6 Larson, Ron; Hostetler, Robert (2007), Precalculus:A Concise Course, Houghton Mifflin, ISBN 978-0-618-62719-6 Wilson, W.A.; Tracey, J.I. (1925), Analytic Geometry (revised ed.), D.C. Heath "Linear equation", Encyclopedia of Mathematics, EMS Press, 2001 [1994] Retrieved from " Make sure your equation uses the y = m x + b {\displaystyle y=mx+b} format. Plot the b {\displaystyle b} value directly on the y-axis. Convert m {\displaystyle m} into a fraction to find the slope of the graph line. Use the slope (rise over run) to plot points and extend the line from point b {\displaystyle b} . Use a straightedge to connect your points. 1 Make sure the linear equation is in the form y = mx + b. This is called the y-intercept form, and it's probably the easiest form to use to graph linear equations. The values in the equation do not need to be whole numbers. Often you'll see an equation that looks like this: y = 1/4x + 5, where 1/4 is m and 5 is b.[1] m is called the "slope," or sometimes "gradient."[2] Slope is defined as rise over run, or the change in y over the change in x. b is defined as the "y-intercept." The y-intercept is the point at which the line crosses the Y-axis.[3] x and y are both variables. You can solve for a specific value of x, for example, if you have a y point and know the m and b values. x, however, is never merely one value: its value changes as you go up or down the line. 2 Plot the b number on the Y-axis. Your b is always going to be a rational number. Just whatever number b is, find its equivalent on the Y-axis, and put the number on that spot on the vertical axis.[4] For example, let's take the equation y = 1/4x + 5. Since the last number is b, we know that b equals 5. Go 5 points up on the Y-axis and mark the point. This is where your straight line will pass through the Y-axis. Advertisement 3 Convert m into a fraction. Often, the number in front of x is already a fraction, so you won't have to convert it. But if it isn't, convert it by simply placing the value of m over 1.[5] The first number (numerator) is the rise in rise over run. It's how far the line travels up, or vertically. The second number (denominator) is the run in rise over run. It's how far the line travels to the side, or horizontally. For example: A 4/1 slope travels 4 points up for every 1 point over. A -2/1 slope travels 2 points down for every 1 point over. A 1/5 slope travels 1 point up for every 5 points over. 4 Start extending the line from b using slope, or rise over run. Start at your b value: we know that the equation passes through this point. Extend the line by taking your slope and using its values to get points on the equation.[6] For example, using the illustration above, you can see that for every 1 point the line rises up, it travels 4 to the right. That's because the slope of the line is 1/4. You extend the line indefinitely along both sides, continuing to use rise over run to graph the line. Whereas positive-value slopes travel upward, negative-value slopes travel downward. A slope of -1/4, for example, would travel down 1 point for every 4 points it travels to the right. 5 Continue extending the line, using a ruler and being sure to use the slope, m, as a guide. Extend the line indefinitely and you're done graphing your linear equation. Pretty easy, isn't it?[7] EXPERT TIP Joseph Meyer Math Teacher Joseph Meyer is a High School Math Teacher based in Pittsburgh, Pennsylvania. He is an educator at City Charter High School, where he has been teaching for over 7 years. Joseph is also the founder of Sandbox Math, an online learning community dedicated to helping students succeed in Algebra. His site is set apart by its focus on fostering genuine comprehension through step-by-step understanding (instead of just getting the correct final answer), enabling learners to identify and overcome misunderstandings and confidently take on any test they face. He received his MA in Physics from Case Western Reserve University and his BA in Physics from Baldwin Wallace University. Develop strong graphing skills. Drawing graphs by hand will help you develop foundational graphing skills, especially in understanding scales and axes. This will build a strong base for you to use helpful online tools to visualize complex relationships, perform calculations, and prepare for standardized tests. Advertisement Add New Question Question What if there is no number for b? It means the y-intercept is 0. Let's say you have something like y = 5x + 0. The 0 would be taken out because anything plus 0 is itself. Question What if the slope is negative? Then the line will go from top left to bottom right. This is because the rise or run is negative. Question How would I graph an equation that is not in slope intercept form? For example: y-2x=0. Transfer that into a linear equation by taking 2x and reverse the -2x, which brings it to y=2x+0 See more answers Ask a Question Advertisement This article was reviewed by Grace Imson, MA. Grace Imson is a math teacher with over 40 years of teaching experience. Grace is currently a math instructor at the City College of San Francisco and was previously in the Math Department at Saint Louis University. She has taught math at the elementary, middle, high school, and college levels. She has an MA in Education, specializing in Administration and Supervision from Saint Louis University. This article has been viewed 505,595 times. Co-authors: 43 Updated: March 2, 2025 Views: 505,595 Categories: Algebra | Graphs Print Send fan mail to authors Thanks to all authors for creating a page that has been read 505,595 times. "This website helped me study for my test I am about to take. It clearly told me how to do the equation; I was confused how to use a whole number slope, but know I know. Thank you for the authors who created such a clear document."..." more Share your story Linear equation in one variable is the equation that is used for representing the conditions that are dependent on one variable. It is a linear equation i.e. the equation in which the degree of the equation is one, and it only has one variable.A linear equation in one variable is a mathematical statement that involves a first-degree polynomial, and it can be expressed in the form: ax + b = cExample: We can take any variable such as x, y, a, b, etc. Some examples of linear equations in one variable are,2a + 3a = 205x + x = 12, etc.The above equations are linear in one variable as they only have one variable and the highest degree of the variable is 1.Graph of Linear Equation in One VariableThese linear equation can be easily represented on the graphs and they represent the straight line which can be horizontal to the coordinate axis or vertical to the coordinate axis.We represent the mathematical condition using these equations as the condition "a number which is 5 less than twice of itself" is represented by the linear equation,x = 2x - 5 , Where x is the unknown number.In the above equation there is only one variable (x) and the degree of the variable is one thus, it is a linear equation in one variable.Standard Form of Linear Equation in One VariableA linear equation in one variable can be expressed in the standard formax+b = 0where x is the variable and a and b are the constants involved. These constants (a and b) are non-zero real numbers. These equations have only one possible solution for the value of the variable.Solving Linear Equations in One VariableLinear Equations in One Variable can easily be solved by following the steps discussed below,Step 1: Write the given equation in standard form and if a or b is a fraction then take the LCM of the fraction to make them integers.Step 2: The constants are then taken to the right side of the equation.Step 3: All the variables and the constant terms are then simplified to form one single variable term and one single constant.Step 4: The coefficient of the variable is made 1 by dividing both sides with a suitable constant to get the final result.Let's understand the above steps with the help of the following example.Examples on Linear Equation in One VariableSolve the following linear equation in one variable.Example: Solve 3x + 1/2 = (1/2)x - 13/2Solution:Step 1: Arranging in standard form and taking LCM3x - (1/2)x + 1/2 + 13/2 = 0⇒ (6x - x + 1 + 13)/2 = 0⇒ 6x - x + 1 + 13 = 0Step 2: Transposing the constant to the right-hand side6x - x = -1 - 13Step 3: Simplification5x = -14Step 4: Make coefficient of x to 1Dividing both sides by 5 we get,5x/5 = -14/5x = -14/5This is the required solution.Linear Equations and Non-Linear EquationsAs we have already learned that linear equations are the equations with the highest degree of "one" and they represent a straight line on the coordinate plane. Examples of linear equations are,3x = 5x + y = 123x - 4y = 11, etc.All these linear equations represent the straight line in coordinate planes. All the equations which have a degree greater than one are called non-linear equations they represent curves in the coordinate plane. Various types of non-linear equations represent various types of curves in the 2-D plane. Some of the common curves which we study are,Circle: x2 + y2 = 49, this equation represents a circle in an x-y coordinate plane with a center at (0, 0) and a radius of 7 units.Similarly,All these equations discussed above are non-linear equations.Difference between Linear Equations and Non-Linear EquationsThe key differences between Linear Equations and Non-Linear Equations are:FeatureLinear EquationsNon-Linear EquationsDefinitionEquations of the form ax + by = c, where a, b, and c are constants, and x and y are variables raised to the power of 1.Equations where the highest power of the variables is greater than 1, or variables are multiplied together.GraphRepresented by straight lines.Represented by curves or irregular shapes.Solution(s)Always forms a straight line when graphed.Can form curves, loops, or irregular shapes when graphed.Number of SolutionsAlways one solution (if the lines intersect).Can have multiple solutions or none.Solution MethodSolvable using algebraic methods like substitution, elimination, or graphing.Often require numerical or iterative methods for solutions.Must ReadAlso CheckLinear Equation in One Variable ExamplesExample 1: Solve for y, 8y - 4 = 0Solution: Solving for value of y, Adding 4 to both sides of the equation , 8y -4 + 4 = 4 8y = 4Dividing both sides of equation by 8 y = 4/8Simplifying the equation , y = 1/2Example 2: Solve the equation in x, 3x +10 = 55Solution: Taking constants to RHS, 3x = 45 x = 15Example 3: Solve the equation in x, 4/x5 -5 = 15Solution: 4/x5 -5 = 15⇒ 4x/5 = 15 + 5⇒ 4x/5 = 20⇒ x = 20×5/4⇒ x = 25Example 4: The age of Ravi is twice the age of his sister Kiran if the sum of their age is 24 find their individual age.Solution:Let the age of Kiran is x, then the age of Ravi is 2xGiven, the sum of their ages is 24x + 2x = 24⇒ 3x = 24⇒ x = 8Thus, the age of Kiran = x = 8 yearsAge of Ravi = 2x = 2×8 = 16 yearsExample 5: Akshay earns three times more than Abhay and if the difference in their salaries is Rs 5000 find their individual salaries.Solution:Let the salary of Abhay be x, then the salary of Akshay is 3xGiven, the difference in their salaries is Rs 50003x - x = 5000⇒ 2x = 5000⇒ x = 2500Thus, the salary of Abhay = x = Rs 2500The salary of Akshay = 3x = 3×2500 = Rs 7500 Graphing Linear Equations is the process of representing linear equations with one or two variables on a graph. A linear equation is an equation of degree one i.e. the highest power or exponent value of the variable can only be 1, not greater than 1 in any of the cases. Solving a linear equation is to find the value of variables contained in it and the graphical method is one of the methods to solve linear equations, either one or two variables linear equations. What is Graphing Linear Equations? Linear equations are algebraic equations in which each term has a real constant and the equation contains 2 variables of the highest power 1. We represent the linear equation in y=mx+b form, also known as the y-intercept form. The representation of a linear equation on a graph is called graphing linear equations shown as a straight line with one or two variables. Let us see an example of graphing a linear equation with one variable. We have to represent the equation x+2y=7 in a graph. Here, the equation x+2y=7 makes a straight line on the graph. Similarly, all linear equations create a straight line on the graph with both one or two variables. The graph of a linear equation in one variable x forms a vertical line that is parallel to the y-axis and vice-versa, whereas, the graph of a linear equation in two variables x and y forms a straight line. The graphing of linear equations helps in solving many real-life problems in linear programming. Note: The point where any line crosses the x-axis on the graph - X-intercept The point where any line crosses the y-axis on the graph - Y-Intercept Graphing Linear Equations Graphing a linear equation is about solving the linear equations and representing the solution in a coordinate plane. While plotting the equation on a graph, the two pairs (x,y) are sufficient. However, we cannot find out if there are any mistakes in obtaining these values as the two points can always be joined and represented as a line. Hence, it is advised to plot one more point to ensure that the solutions obtained for the given linear equation are correct. The following steps are to be taken up for plotting a linear equation with one variable: Make sure the linear equation is in y-intercept form, which is y = mx + b. Apply the trial and error method and find the value of (x, y) up to three pairs, which satisfy the linear equation. Find the x-intercept and y-intercept of the equation. For y-intercept, substitute the value of x = 0 in the equation. This results in x = a, for x-intercept, substitute the value of y = 0 in the equation. This results in y = c. Thus, the points are (a, 0) and (0, c). Make a tabular form and put the value of x and y respectively. Plot all the points on the graph paper. Join all the points which are marked on the graph and you will get a straight line representing the given linear equation graphically. Example: Draw a graph of the linear equation x+2y=7. Solution: We will follow the following steps: Step 1: Check if the given linear equation x+2y=7 is of the form of y = mx + b. [On converting, we get: y = - (1/2) x + 7/2] Step 2: Find the x and y-intercept respectively. For that, put y = 0 in the equation: x = 7-2(0), x=7. Now, put x=0 in the equation. 2y=7-(0), y=7/2 = 3.5 Step 3: Apply the trial and error method and find 3 pairs of values of (x, y) that satisfy the given linear equation x=7-2y. (See table below) Step 4: Plot the points (7,0), (5,1), and (3,2) on the graph. Step 5: Join all the points which are marked on the graph paper and get a straight line that represents the given linear equation graphically. See the values of x and y in the following table: Graphing Linear Equations in Two Variables Graphing linear equations in two variables is done in a similar manner as one variable. The lines plotted on the graph can either intersect each other at one point or be parallel to each other resulting in no solution. Sometimes, the lines might coincide with each other leaving each point on that line as a solution resulting in the given system having an infinite number of solutions. If the system has a solution, then it is said to be consistent; otherwise, it is said to be inconsistent. The following are the steps to graphing linear equations in two variables: Step 1: To graph a linear equation with two variables, we graph both equations. Step 2: To graph an equation manually, first convert it to the form y=mx+b by solving the equation for y. Step 3: Start putting the values of x as 0, 1, 2, and so on and find the corresponding values of y, or vice-versa. Step 4: Identify the point where both lines meet. Step 5: The point of intersection is the solution. Example: Find the solution of the following system of equations graphically. -x+2y-3 =0 3x+4y-11=0 Solution: Using the steps mentioned above, we will graph them and see whether they intersect at a point. As you can see below, both lines meet at (1, 2). Thus, the solution of the given system of linear equations is x=1 and y=2. Important Points Linear equation in two variables has infinitely many solutions. The graph of a linear equation is always a straight line. The equation y = mx is always passing through the origin (0, 0). Challenging Questions The sum of the digits of a two-digit number is 8. When the digits are reversed, the number is increased by 18. Find the number. Jake's piggy bank has 11 coins (only quarters or dimes) that have a value of $1.85. How many dimes and quarters does the piggy bank have? Topics Related Example 1: Isabella has the linear equation x - 2y = 2. Help her to draw the linear equation on the graph. Solution: The given linear equation is x-2y=2. Convert the equation in the form of y = mx + b⇒ y= x/2 - 1. We need to find the x and y-intercept respectively. For that, put y=0 in the equation⇒ x=2(0)+2, x=2. Now, put x=0 in the equation. 2y=(0) - 2, y=1. Now, we will apply the trial and error method, and find 3 pairs of values of (x, y) that satisfy the given linear equation y=x/2-1. See the values of x and y in the following table: Plot the points (2,0),(4,1),(0,-1) on the graph. Join all the points which are marked on the graph paper and get a straight line that represents the given linear equation graphically. Example 2: William wants to plot the graph of -1/2x+1/3y=1. Help him to plot the graph for linear equations. Solution: The given linear equation is -1/2x+1/3y=1. Convert the equation in the form of y = mx + b⇒ 6 + 6x/2. We need to find the x and y-intercept respectively. For that, we can apply the hit and trial method, put y=6 in the equation⇒ x=3. Now, put x=2 in the equation. y=3. See the values of x and y in the following table: x 2 0 y 6 3 Solutions (2,6) (0,3) View More > go to slidego to slide FAQs on Graphing Linear Equations The basic methods of the graphing linear equation: The first method is by plotting all points on the graph and then drawing a line through the points. The second is by using the y-intercept of the equation and slope of the equation. What Are the 3 Ways to Graph a Linear Equation? The 3 ways to graph a linear equation: Using two points to plot the graph of a linear equation. Use the slope and y-intercept of a linear equation. Using the x- and y-intercepts of a linear equation. How Do you Graph a Linear Equation with Two Points? Graphing linear equation with two points: Find the y-intercept from the linear equation and plot the point. From the y-intercept of the linear equation, use the slope to find the second point and plot it on the graph. Draw a straight line to connect the two points on the graph. What Is the Formula For a Linear Equation? The formula for a linear equation is y = mx + b. How Do you Graph a Linear Equation Using Intercepts? To find intercepts algebraically, we use the fact that all x-intercepts have y=0 and all y-intercepts have x=0. Determine the corresponding values of x and y by putting the values of x-intercepts and y-intercepts respectively. What Is the Minimum Number of Points Needed to Graph a Linear Equation? Two points are the minimum number of points needed to graph a linear equation How Do you Find the Y-Intercept of a Graph? The y-intercept of a graph is the point at which the graph crosses the y-axis and at y point, the x-coordinate is zero. How Do you Find the Intercepts of a Graph? First of all, an equation must satisfy ax+by=c. Then you just set x = 0 to find the y-intercept and set y = 0 to find the x-intercept. Then find the corresponding values. Sign Up Now &Daily Live Classes3000+ TestsStudy Material & PDFQuizzes With Detailed Analytics+ More BenefitsGet Free Access Now