How do i know if an equation is linear

How do i know if an equation is a linear function. How do you tell if an equation is linear. How do i know if an equation is linear or not. How can you tell if an equation is linear. How do i know if an equation is linear or nonlinear. How to know if the equation is linear.

Linear function is popular in economics. It is attractive because it is simple and easy to handle mathematically. It has many important applications. Linear functions are those whose chart is a straight line. A linear function has the following y = f(x) = a + bx A linear function has an independent variable and an dependent variable. The independent variable is x and the dependent variable is y. a is the constant term or interception y. It is the value of the dependent variable when x = 0. b is the coefficient of the independent variable. It is also known as the slope and gives the change rate of the dependent variable. Graphics of a linear function For graph a linear function: 1. Find 2 points that match equation 2. Tramarli 3. Connect points with a straight line Example: y = 25 + 5x leave x = 1 then y = 25 + 5(1) = 30 let x = 3 then y = 25 + 5(3) = 40 A simple example of a linear equation A company has fixed costs of $7,000 for plant and equuipment costs and variables of $600 for each output unit. What is the total cost at various levels of output? let x = output unit let C = total cost C = fixed cost plus variable cost = 7,000 + 600 x total output cost 15 units C = 7,000 + 15(600) = 16,000 30 units C = 7,000 + 30(600) = 25,000 Linear equation combinations Linear equations can be added together, multiplied or divided. A simple example of adding linear equations C(x) is a C(x) = fixed cost + variable cost R(x) is a R(x) income function = sales price (number of items sold) equal income less cost P(x) is a P(x) = R(x) - C(x) x = number of items produced and sold Data: A company receives $45 for each production unit sold. It has a variable cost of $25 per item and a fixed cost of $1600. What is its profit if it sells (a) 75 articles, (b)150 articles, and (c) 200 articles? R(x) = 45x C(x) = 1600 + 25x P(x) = 45x -(1600 + 25x) = 20x - 1600 let x = 75 P(75) = 20(75) - 1600 = -100 a loss leave x = 150 P(150) = 20(150) - 1600 = 1400 let x = 200 P(200) = 20(200) - 1600 A function is a relationship with the property that each input is connected to an output exactly. A relationship is a set of ordered couples. The graph of a linear function is a straight line, but a vertical line is not the graph of a function. All linear functions are written as equations and are characterized by their slope and [latex]y[/latex]-intercept. Key Terms Report: A collection of ordered couples. variable: A symbol representing a quantity in a mathematical expression, as used inscience. Linear function: linear:Algebraic equation in which each term is either a constant or the product of a constant and (the first power of) a single variable. function: a relationship between an input set and an output set admissible with the property that each input is correlated exactly to an output. a linear function is an algebraic equation in which each term is a constant or product of a constant and (the first power of) a single variable. for example, a common equation, [latex]y=mx+b[/latex], (i.e. the form of intercept slope, which we will talk about later) is a linear function because it meets both criteria with [latex]x[/latex] and [latex]y[/latex] as variables and [latex]m[/latex] and [latex] the exponent of the term [latex]x[/latex] is one (first power,) and follows the definition of a function: for each input ([latex]x[/latex]) there is exactly an output ([latex]y[/latex]). â moreover, its chart is a straight line. The line. Linear function graphics The origin of the name "linear" comes from the fact that the whole of the solutions of this equation forms a straight line in the plane. in the underlying linear functional charts, the constant [latex]m[/latex], determines the slope or gradient of the straight one, and the constant term [latex]b[/latex], determines the point where the straight crosses the axis [latex]y[/latex], otherwise known as intercept [latex]y[/latex]. Linear function graphs: blue line, [latex]y=\frac{1}{2}x-3[/latex] and red line, [latex]y=-x+5[/latex] are both linear functions. â the blue line has a positive slope of [latex]\frac{1}{2}[/latex] and a [intercept [latex]y[/latex] of [latex]-3[/latex]; the red line has a negative slope of [latex]-1[/latex] and an intercept [latex]y[/latex] of [latex]5[/latex]. vertical and horizontal lines have an indefinite slope, and cannot be represented in the form [latex]y=mx+b[/latex], but rather as equation of the form [latex]x=c[/latex] for a constant [latex]c[/ â for example, the graph of the equation [latex]x=4[/latex] vertical lines are not functional, however, since each input is related to multiple ocitis. the horizontal lines have a gradient of zero and are represented by the shape, [latex]y=b[/latex], where [latex]b[/latex] is the intercept [latex]y[/latex]. â a graph of the equation [latex]y=6[/latex] includes the same ocita value of 6 for all input values on the line, such as [latex] (-2,6), (0,6), (2,6), (6,6) [/latex,] etc. â horizontal lines are function because the relationship (set of points) has the characteristic that each input is correlated exactly to an output. slope describes the direction and slope of a line, and cangiven two points on the line. calculates the slope of a straight oando «Salking on race» and identifies the role of the slope in a linear equation key points the slope of a straight is a number describing both the direction and the slope of the straight; its sign indicates the direction, while its magnitude indicates the slope. the relationship between the increase and the execution is the slope of a line, [latex]m = \frac{rise}{run}[/latex]. the slope of a straight can be calculated with the formula [latex]m = \frac{y_{2} – y_{1}}{x_{2} – x_{1}}[/latex], where [latex] (x_1, y_1) /[latex] and [latex] (x_2, y_2) /[latex] are points on the straight. Key terms repidizes: the speed with which a function departs from a reference. direction: increase, decreasing, horizontal or vertical. in mathematics, the slope of a straight is a number describing both the direction and the slope of the straight. the slope is often indicated by the letter [latex]m[/latex]. recalls the slop-intercept shape of a line, [latex]y = mx + b[/latex]. putting the equation of a straight in this form is obtained the slope ([latex]m[/latex]) of a straight, and its intercept [latex]y[/latex] ([latex]b[/latex]). we will now discuss the interpretation of [latex]m[/latex] and how to calculate [latex]m[/latex] for a given line. the direction of a line is increasing, decreasing, horizontal or vertical. a line is growing if it rises from left to right, which implies that the slope is positive ([latex]m > 0[/latex]). a line is decreasing if it descends from left to right and the slope is negative ([latex]m < 0[/latex]). if a line is horizontal the slope is zero and is a constant function ([latex]y=c[/latex]). if a line is vertical the slope is indefinite. slope of the lines: the slope of a line can be positive, negative, zero or indefinite. the slope of a line is measured by the absolute value of the slope. a slope with a higher absolute value indicates a steeper line. in other words, a line with a slope of [latex]-9[/latex] is steeper than a line with a slope of [latex]7[/latex]. calculation of the slope is calculated by finding the ratio between the "vertical change" and the "horizontal change" between two separate points on a line. This report is represented by a quotient ('running increase') and gives the same number for each two separate points on the same line. is represented by [latex]m = \frac{rise}{run}[/latex].[latex][/latex] slope display: the slope of a line is calculated as "to rise above the race". mathematically, the slope m of the line is: [latex]\displaystyle m = \frac{y_{2} – y_{{{{{2} 1}{x_{2} – x_{1}}[/latex] two points on the straight are needed to find [latex]m[/latex]. data two points [latex] (x_1, y_1) /[latex] and [latex] (x_2, y_2) /[latex,] take a look at the chart below and notice how the "increase" of the slope is given by the difference in the valuesof the two points, and the "run" is given by the difference in the values [latex]x[/latex]. Pendence Pendenzagraphically: the slope [latex]m =\frac{y_{2} "y_{1}}{x_{2} "x_{1}}[/latex] is calculated from the two points [latex]\left (x_1,y_1 \right) [/latex] and [latex]\left (x_2,y_ 2 \right) [/latex] we will now look at some graphs on a grid in many cases, we can find the slope simply counting the climb and the ride. we start by identifying two points on the line. If possible, we try to choose points with coordinates that are entire to facilitate our calculations. example finds the slope of the line shown on the below coordinates plane. find the slope of the line: note that the line is increasing, so make sure you look for a positive slope. locates two points on the chart, choosing points whose coordinates are whole. oeremo [latex] (0, -3) [/latex] and [latex] (5, 1) [/latex.] starting from the point to the left, [latex] (0, -3) [/latex,] drawing a rectangle triangle, going from the first point to the second point, [latex] (5, 1) [/latex] identifying points on the line: draws a triangle to help identify the climb and the ride. counts the rise on the vertical leg of the triangle: [latex]4[/latex] unit. counts the race on the horizontal leg of the triangle: [latex]5[/latex] unit. oa the slope formula to take the ratio between increase and execution: [latex]\displaystyle \begin{align} m &= \frac{rise}{run}\ &= \frac{4}{5} \end{align}[/latex] line slope is [latex]\frac{4}{5}[/latex]. Note that the slope is positive because the line leans upwards from left to right. example finds the slope of the line shown on the below coordinates plane. finds the slope of the straight: we can see that the slope is decreasing, so make sure you look for a negative slope. locate two points on the chart. search for the coordinates that are entire. we can choose any point, but we will [latex] (0, 5) [/latex] and [latex] (3, 3) [/latex] identify two points on the straight: [latex] (0, 5) [/latex] and [latex] (3, 3) [/latex] are on the straight. [latex]\displaystyle m =\frac{y_{2} – y_{1}} – x_{1}}[/latex] leaves [latex] (x_1, y_1) [/latex] both the [latex] point (0, 5) [/latex,] and [latex] (x_2, y_2) [/latex] is the [latex] point (3, 3) [/latex] [latex]\displaystyle \begin{align} m &= \frac{3-5}{3-0} \\ &= \frac{-2}{3}{3} \end{align}[/latex] line slope is [latex-] \frac{2}{3}[/latex]. note that the slope is negative because the line leans down from left to right. direct and reverse variation two variables in direct variation have a linear relationship, while variables in reverse variation do not. recognize examples of functions that vary directly and inversely two key points that change proportionally to each other are in direct variation. the relationship between two variables directlycan be represented by a linear equation in the form of a slope - interior, and is easily modelled using a linear chart. the reverse variation is the opposite of directtwo variables are said to be inversely proportional when one variable undergoes a change and the other undergoes the opposite. The relationship between two inversely proportional variables cannot be represented by a linear equation, and its graphical representation is not a line, but a hyperbola. Key Terms Hyperbola: Conical section formed by the intersection of a cone with a plane that intersects the base of the cone and is not tangent to the cone. proportional: Constant ratio. Two magnitudes (numbers) are called proportional if the second varies arithmetically in direct relation to the first. Simply put, two variables are in direct change when the same thing that happens to one variable happens to the other. If [latex]x[/latex] and [latex]y[/latex] are in direct variation and [latex]x[/latex] is doubled, also [latex]y[/latex] will be doubled. The two variables can be considered directly proportional. For example, a toothbrush costs [latex]2[/latex] dollars. The purchase of [latex]5[/latex] toothbrushes would cost [latex]10[/latex] dollars, and the purchase of [latex]10[/latex] toothbrushes would cost [latex]20[/latex] dollars. So we can say that the cost varies directly as the value of the toothbrushes. Direct variation is represented by a linear equation, and can be modeled by drawing a line. Since we know that the relation between two values is constant, we can give their relation with: [latex]\displaystyle \frac{y}{x} = k[/latex] Where [latex]k[/latex] is a constant. Rewriting this equation by multiplying both sides by [latex]x[/latex] gives: [latex]\displaystyle y = kx[/latex] Note that this is a linear equation in the form of slope intercept, where the intercept [latex]y[/latex] equals [latex] latex]]0[/latex]. Thus, every line passing through the source represents a direct variation between [latex]x[/latex] and [latex]y[/latex]: Directly proportional variables: The graph of [latex]y = kx[/latex] shows an example of a direct variation between two variables. Reviewing the example with toothbrushes and dollars, we can define [latex]x[/latex] as the number of toothbrushes and [latex]y[/latex] as the number of dollars. In doing so, the variables stick to the relationship: [latex]\displaystyle \frac{y}{x} = 2[/latex] Any increase in one variable would lead to an equal increase in the other. For example, doubling [latex]y[/latex] would result in doubling [latex]x[/latex]. Reverse variation The reverse variation is the opposite of the direct variation. If there is a reverse change, the increase in one variable means the decrease in another. In fact, two variables are said to be inversely proportional when a change operation is made on one variable and the opposite happens on the other. For example, if [latex]x[/latex] and [latex]y[/latex] are inversely proportional, if [latex]x[/latex] is Then [LATEX] Y [/ LATEX] is halved. As an example, the time needed for a one It is inversely proportional to the speed of the trip. If your car travels to a major speed, the journey to your destination will be shortest. Knowing that the relationship between the two variables is constant, we can demonstrate that their relationship is: [LATEX] DisplayStyle YX = K [/ LATEX] Where [LATEX] K [/ LATEX] is a constant known as the constant of proportionality. Note that until [LATEX] K [/ LATEX] is not equal to [LATEX] 0 [/ LATEX], NÃ © [LATEX] X [/ LATEX] NÃ © [LATEX] Y [/ LATEX] can ever match [LATEX] 0 [/ LATEX]. We can reorganize the equation above to position the variables on the opposite sides: [LATEX] DisplayStyle y = frac {k} {x} [/ LATEX] Note that this is not a linear equation. It is impossible to put it in the form of a slope-intercepted. Thus, a reverse relationship cannot be represented by a constant slope line. Reverse variation can be illustrated with a hyperbola shaped graph, shown below. Reverse proportional function: an inversely proportional relationship between two variables is graphically represented by a hyperbola. Zero of linear functions at zero, or [LATEX] X [/ LATEX] - Interception, is the point where the value of the linear function will be zero. Drill find zeroes of linear functions Key points a zero is a point where the value of a function will be equal to zero. Its coordinates are [LATEX] (X, 0) [/ LATEX], where [LATEX] X [/ LATEX] is equal to the zero of the graph. The zeroes can be observed graphically or solved for algebrail. A linear function cannot have anyone, one, or infinitely many zeros. If the function is a horizontal line (slope = [LATEX] 0 [/ LATEX]), you will not have zeros unless your equation [LATEX] Y = 0 [/ LATEX], in this case will have many infinitely. If the line is horizontal, you will have a zero. Zero key terms: also known as a root; A value [LATEX] X [/ LATEX] in which the [LATEX] X [/ LATEX] function is equal to [LATEX] 0 [/ LATEX]. Linear function: an algebraic equation in which each term is a constant or the product of a constant and (the first power of) a single variable. Y-Intercept: a point where a line crosses the [LATEX] Y [/ LATEX] axis of a Cartesian grid. The graph of a linear function is a straight line. Graphically, where the line crosses the [LATEX] X [/ LATEX] axis, it is called zero, or root. Algebrigately, a zero is a value [LATEX] X [/ LATEX] in which the [LATEX] X [/ LATEX] function is equal to [LATEX] 0 [/ LATEX]. The linear functions cannot have anyone, one, or infinitely many zeros. If there is a horizontal line through any point on the axis [LATEX] Y [/ LATEX], different from scratch, there are no zeros, since the line never crosses the axis [LATEX] X [/ LATEX] . If the horizontal line overlaps with the [LATEX] X [/ LATEX] axis, (pass through the [LATEX] Y [/ LATEX] axis to zero) then there are countless zeros, since the line intersects the axis [LATEX] X [/ LATEX] -Axis more times. In the end, the line is vertical or has a slope, then there will be only one zero. Find the zero ofFunctions Graphically Zeros can be viewed graphically. A latex]x[/latex]-intercept, or zero, is a property of many functions. Since the latex]x[/latex]-intercept (zero) is a point where the function crosses the latex]x[/latex]-assis, it will have the value latex] (x,0) [/latex where latex]x[/latex is zero. All lines, with a value for slope, will have one zero. To find the zero of a linear function, just find the point where the line crosses the latex]x[/latex]-axis. Linear function zero: The blue line, latex]y=\frac{1}{2}x+2[/latex, has a latex zero] (-4,0) [/latex; the red line, latex]y=-x+5[/latex, has a latex zero] (5,0) [/latex. Since every line has a value for the slope, every line has exactly a zero. Finding the Zeros of Linear Functions Algebraically To find the zero of a linear function algebraically, set latex]y=0[/latex] and solve for latex]x[/latex. The zero to solve the linear function above graphically must match by solving the same function algebraically. Example: Find the Zero of Latex]y=\frac{1}{2}x+2[/latex] algebraically First, replace latex]0[/latex]y[/latex: [latex]\displaystyle 0=\frac{1}{2}x+2[/latex] Next, solve for latex]x[/latex. Subtract latex]2[/latex] e then multiply by latex]2[/latex to obtain: [latex]\displaystyle \begin{align} frac{1}{2}x&=-2 x&=-4 \end}[/latex] Zero is latex] (-4.0) [/latex. This is the same zero that was found using the graph method. Pilo Intercept Equations The slope intercept shape of a line summarizes the information needed to quickly construct its graph. Convert linear equations to slope-intercept form and explain why it is useful Key Takeaways Key points The slope-intercept form of a line is given by [latex]y = mx + b[/latex] where the latex]m[/latex] is the slope of the line and latex]b[/latex] It is the latex]y[/latex]-intercept. The constant latex]b[/latex is known as latex]y[/latex]-intercept. From the slope intercept modulus, when latex]x=0[/latex, latex]y=b[/latex, and the point latex] (0,b) [/latex] is the single point on the line also on the latex]y[/latex]-assis. To graph a slope-intercept line, first plot the latex]y[/latex]-intercept, then use the slope value to locate a second point on the line. If the slope value is an integer, use a latex]1[/latex] for the denominator. Use algebra to solve for latex]y[/latex] if the equation is not written as a slope intercept. Only then can the value of slope and latex]y[/latex]-intercept be located by the equation accurately. Keyword track: The ratio of vertical and horizontal distances between two points on a line; zero if the line is horizontal, undefined is vertical. y-intercept: A point where a line crosses the latex]y[/latex]-axes of a Cartesian grid. One of the most common representations for a line is with the slope-intercept shape. This equation is given by where [latex]x[/latex] and [latex]y[/latex] are variable and [latex]m[/latex] and [latex]b[/latex] are constant. â when written in this form, the constant [latex]m[/latex] is the value of the slope and [latex]b[/latex] is the [latex] â note that if [latex]m[/latex] is [latex]0[/latex], then [latex]y=b[/latex] is a horizontal line. Note that this equation does not take into account the vertical lines, since this would require that [latex]m[/latex] is infinite (not defined.) â however, a vertical line is defined by the equation [latex]x=c[/latex] for a certain constant [latex]c[/latex]. converting an equation in slope-intercept form to write an equation in the slope-intercept form is useful because from the shape it is easy to identify the slope and [latex]y[/latex]-intercept. â this helps to find solutions to various problems, such as chart, comparison of two lines to determine whether they are parallel or perpendicular and the resolution of an equation system. â Just replace the values in the slope-intercept module to get: [latex]\displaystyle y=-\frac{2}x+3[/latex] if an equation is not in the form of intercept slope, resolve [latex]y[/latex] and rewrite the equation. example we write the equation [latex]3x+2y=-4[/latex] in the slope-intercept form and we identify the slope and [latex]y[/latex]-intercept. to solve the equation of [latex]y[/latex], first subtract [latex]3x[/latex] from both sides of the equation to obtain: [latex]\displaystyle 2y=-3x-4[/latex] then divide both sides of the equation for [latex]2[/latex] to get: [latex]\displaystyle y=\frac{1}{2}(-3x-4) /[latex] that simplifies in [latex]y=-\frac{3}{2}x-2[/latex]. â now that the equation is in the form of the intercept slope, we see that the slope [latex]m=-\frac{3}{2}[/latex] latex]y[/latex]-intercept [latex]b=-2[/latex]. drawing an equation in the Pendenza-Intercept form we begin by building the equation chart in the previous example. example we build the chart the line [latex]y=-\frac{3}{2}x-2[/latex] by oando the slope-intercept method. We begin by tracing the intercept [latex]y[/latex]b=-2[/latex], whose coordinates are [latex] (0,-2) /[latex.] â the slope value said where to place the next point. because the slope value is [latex]\frac{-3}{2}[/latex], the increase is [latex]-3[/latex] and the race is [latex]2[/latex]. â this means that from the intercept [latex]y[/latex] it moves [latex]3[/latex] â So we get to the point [latex] (2,-5) [/latex] on the line. if the negative sign is placed with the gradient the gradient is written as [latex]\frac{3}{-2}[/latex], we can instead move [latex]3[/latex] drive and leave [latex]2[/latex] drive from the intercept [latex]y[/latex] to get to the [latex] point (-2,1) /[latex,]Graph: Row chart [LATEX] Y = - frac {3} {2} x-2 [/ LATEX]. Example It was graphic The [LATEX] 12x-6Y-6 = 0 [/ LATEX] equation. First we solve the equation for [LATEX] Y [/ LATEX] Ã, undertaking [LATEX] 12x [/ LATEX] Ã, to obtain: [LATEX] DisplayStyle -6Y-6 = -12x [/ LATEX] forward, Add [LATEX] Next] 6 [/ LATEX] Ã, to obtain: [LATEX] DisplayStyle -6Y = -12x + 6 [/ LATEX] Finally, divide all the terms of [LATEX] -6 [/ LATEX] â, To obtain the slope shut-off module: [LATEX] DisplayStyle Y = 2x-1 [/ LATEX] The slope is [LATEX] 2 [/ LATEX] and [LATEX] Y [/ LATEX] -ertercept is [latex] -1 [/ LATEX]. Ã, using this information, the graph is easy. Ã, start by tracing [latex] y [/ lathex] -ertercept [latex] (0, -1) [/ lathex], then use the slope value, [latex] frac {2} {1} [/ latex] , to move up [LATEX] 2 [/ LATEX] Ã, unit and right [LATEX] 1 [/ LATEX] Ã, Unit. SLOPE-INTERCEPT graph: Row graph [LATEX] Y = 2x-1 [/ LATEX]. The starting point equations The point-slope equation is another way to represent a line; Only the slope and a single point are needed. Use the Point-Slope module to find the equation of a line that passes through two points and check that it is equivalent to the shape of interception of the slope of the key to the key points of the Takeaways the point - the slope equation is given by [Latex] y- y_ {1} = m (x-x_ {1}) [/ latex], where [latex] (x_ {1}, y_ {1}) [/ latex] is any point on the line e [LATEX] M [/ LATEX] is the slope of the line. The stitch equation requires that there is at least one point and the slope. If there are two points and no slope, the slope can first be calculated from the two points and then choose one of the two points to write the equation. The stitch equations and the Slope-intercepted equations are equivalent. Ã, it can be demonstrated that a point [latex] (x_ {1}, y_ {1}) [/ lathex] and slope [latex] m [/ lathex], [latex] y [/ lathex] -ertercept ([latex] B [/ LATEX]) In the Slope-Intercept equation is [LATEX] Y_ {1} -MX_ {1} [/ LATEX]. Point-Slope Equation key terms: an equation of a line given a point [LATEX] (X_ {1}, Y_ {1}) [/ LATEX] and a slope [LATEX] M [/ LATEX]: [LATEX] Y - y_ {1} = m (x-x_ {1}) [/ LATEX]. Point gradient equation The point-slope equation is a way to describe the equation of a line. The Point-Slope module is ideal if you are given the slope and only one point, or if you are given two points and don't know what [LATEX] Y [/ LATEX] -ertercept. Given a slope, [LATEX] M [/ LATEX] and a point [LATEX] (X_ {1}, Y_ {1}) [/ LATEX], the point-slope equation is: [LATEX] DisplayStyle Y- Y_ {1} = m (x-x_ {1}) [/ LATEX] Check that the Point-Slope module is equivalent to the slope shut-off module to show that these two equations are equivalent, choose a point [LATEX] (X_ {1}, Y_ {1}) [/ LATEX]. Connect the generic point to the equation [LATEX] Y = MX + B [/ LATEX]. Ã, the equation is now, [latex] y_ {1} = mx_ {1} + b [/ lathex], giving us the ordered torque, [latex] (x_ {1}, mx_ {1} + b) [/ Lathex]. Then connect this point in the stitch equation and resolve for [LATEX] Y [/ LATEX] Ã, to obtain: [LATEX] DisplayStyle Y- (MX_ {1} + b) = m (x-x_ {1 }) [/ LATEX] Distributes the negative sign and distributes distributes [Latex] (x-x_ {1}) [/ lathex]: [latex] displaystyle y-mx_ {1} -b = mx-mx_ {1} [/ latex] Add [latex] mx_ {1} [/ Latex] Ã, to both parties: [latex] displaystyle y-mx_ {1} + mx_ {1} -b = mx-mx_ {1} + mx_ {1} [/ latex] combines as terms: [latex] DisplaySyle YB = MX [/ LATEX] Add [LATEX] B [/ LATEX] Ã, on both sides: [LATEX] DisplayStyle YB + B = MX + B [/ LATEX] Combine as terms: [LATEX] DisplayStyle Y = MX + B [/ LATEX] Therefore, the two equations are equivalent and one or one can express an equation of a line according to what information is provided in the problem or what type of equation is required in the problem. Example: Write the equation of a line in the shape of a point of the point, given a point [LATEX] (2.1) [/ LATEX] Ã, and SLOPE [LATEX] -4 [/ LATEX] and converted into the form of Slope -InterCept write the line equation in the shape of the point-slope: [LATEX] DisplayStyle Y-1 = -4 (X-2) [/ LATEX] To change this equation in the form of a slope interception, resolve the equation For [Latex] Y [/ LATEX]: [LATEX] DisplayStyle Y-1 = -4 (X-2) [/ LATEX] Distribute [LATEX] -4 [/ LATEX]: [LATEX] DisplayStyle Y-1 = -4x + 8 [/ latex] Add [LATEX] 1 [/ LATEX] Ã ¢ On both sides: [LATEX] DisplayStyle y = -4x + 9 [/ LATEX] The equation has the same meaning as formed And it produces the same graph. Line graph: Line graph [latex] Y-1 = -4 (X-2) [/ LATEX], through the [LATEX] point (2.1) [/ LATEX] Ã ¢ with [LATEX] slope - 4 [/ LATEX], as well as the slope shut-off module, [LATEX] Y = -4x + 9 [/ LATEX]. Example: Write the equation of a line in format in format, given the point [LATEX] (- 3.6) [/ LATEX] Ã ¢ and point [LATEX] (1.2) [/ LATEX] and converted to slope - Shape of interception since we have two points, but without slope, we must first find the slope: [LATEX] DisplayStyle m = frac {y_ {2} -Y_ {1}} {x_ {2} -x_ {1} } [/ latex] Replace the values of the points: [LATEX] DisplayStyle Begin {align} M & = Frac {--2-6} {1 - (- 3)} {1 - (- 3)} { 3)} {3) 4} & = - 2 END {ALLINEA} [/ LATEX] Now choose one of the two points, such as [LATEX] (- 3.6) [/ LATEX]. Connect this point and the slope calculated in the point-slope equation to obtain: [LATEX] DisplayStyle Y-6 = -2 [X - (- 3)] [/ LATEX] Be careful if one of the coordinates is negative. Ã, distribute the negative sign through the parentheses, the final equation is: [LATEX] DisplayStyle Y-6 = -2 (X + 3) [/ LATEX] If you choose the other point, the equation would be: [LATEX] Y + 2 = -2 (X-1) [/ LATEX] Ã ¢ and the answer is correct. Next Distribute [LATEX] -2 [/ LATEX]: [LATEX] DisplayStyle Y-6 = -2x-6 [/ LATEX] Add [LATEX] 6 [/ LATEX] on both sides: [LATEX] DisplayStyle Y = - 2x [/ LATEX] again, the two forms of equations are equivalent to each other and produce the same line. Ã, the only difference is the form that are written in. Equations In Standard form a standard written linear equation simplifies calculating the zero or [LATEX] X [/ LATEX] -ertercept, of the equation. Explaining the process and utility to convert linear equations to the standard key key key key key mode The standard form of a linear equation is written as: [LATEX] AX + BY = C [/ LATEX]. The standard module is useful in calculating the zero of the equation. For a standard linear equation, if [latex]A[/latex] is non-zero, then the [latex]x[/latex]intercept occurs at [latex]x = \frac{C}{A}[/latex]. Zero keywords: Also known as a root, a zero is a value [latex]x[/latex] at which the function of [latex]x[/latex] is equal to 0. Slope intercept form: A linear equation written in the form [latex]y = mx + b[/latex]. y-intercept: A point where a line crosses the y-a the axis of a Cartesian grid. The standard shape is another way of organizing a linear equation. In the standard form, a linear equation is written as: [latex]\displaystyle Ax + By = C [/latex] where [latex]A[/latex] and [latex]B[/latex] are not both equal to zero. The equation is usually written so that [latex]A \geq 0[/latex], by convention. The graph of the equation is a straight line, and each straight line can be represented by an equation in the standard form. For example, consider an equation in the slope -intercept form: [latex]y = -12x +5[/latex]. To write it in the standard form, note that we have to move the term containing [latex]x[/latex] to the left side of the equation. Add [latex]12x[/latex] to both sides: [latex]\displaystyle y + 12x = 5[/latex] The equation is now in the standard form. Using the Standard Module to Find Zeros Remember that a zero is a point where the value of a function is zero ([latex]y=0[/latex]), and is the [latex]x[/latex] intercept of the function. We know that the y-intercept of a linear equation can be easily found by putting the equation into the slope-intercept form. However, the zero of the equation is not immediately apparent when the linear equation is in this form. However, the zero intercept or [latex]x[/latex] of a linear equation can be easily found by putting it into a standard form. For a standard linear equation, if [latex]A[/latex] is non-zero, then the [latex]x[/latex]intercept occurs at [latex]x = \frac{C}{A}[/latex]. For example, consider the equation [latex]y + 12x = 5[/latex]. In this equation, the value of [latex]A[/latex] is 1, and the value of [latex]C[/latex] is 5. Therefore, the zero of the equation is in [latex]x = \frac{5}{1} = 5[/latex]. Zero is the [latex] point (5, 0) [/latex]. Note that the [latex]y[/latex] intercept and slope can also be calculated using the coefficients and constants of the standard form equation. If [latex]B[/latex] is non-zero, then the y-intercept, i.e. the y-coordinate of the point where the graph crosses the y-axis (where [latex]x[/latex] is zero), is [latex]\frac{C}{B}[/latex], and the slope of the line is [latex]-\frac {A}{B}[/latex]. Example: Find the zero of the [latex]3 equation (y â 2) = \frac{1}{4}x +3[/latex] We have to write the equation in the standard form, [latex]Ax + By = C[/latex], which means we get the terms and [latex]y[/latex] on the left side, and the constants on the right side of the equation. distribute the 3 on the left side: [latex]\displaystyle 3y – 6 = \frac{1}{4}x +3[/latex] add 6 to both[Latex] \ DisplayStyle 3Y = \ frac {1} {4} x + 9 [/ Latex] Subtract [Latex] \ frac {1} {4} x [/ Latex] from both sides: [Latex] \ DisplaySyle 3Y - \ frac {1} {4} x = 9 [/ in latex] Reorganize to [Latex] Ax + By = C [/ Latex]: [Latex] \ Displaystyle - \ frac {1} {4} x + 3Y = 9 [/ Lattice] The equation is in standard form and we can replace the values for [Latex] A [/ Latex] and [Latex] C [/ Latex] in the formula for zero: [Latex] \ DisplayStyle Begin {Align } x & = \ frac {a}} {a}} {9} {- \ frac {1} {4}} {1} {4}} {1} {4}} {1} {4}} {1} {1}} -36 \ End {Alline} [/ Latex] 0) [/ Latex].