Math graph answers

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Enter the equation you want to build, set the dependent variable if you want, and click on the Graph button. Mathematics language is particularly effective in presenting relationships between two or more variables. As an example, consider the distance traveled over a period of time by a car traveling at a constant speed of 40 miles per hour. We can present this relationship at one. The word sentence: The distance traveled in miles equals forty times the number of hours traveled. 2. Equation: d q 40r. 3. Tabulation of values. 4. A graph showing the relationship between time and distance. We have already used the words of sentence and equation to describe such relationships; in this chapter, we'll deal with table and graphic representations. 7.1 SOLVING EQUATIONS IN TWO VARIABLES ORDERED PAIRS Equation d 40f pairs distance d for each time t. For example, if t No 1, then d 40, if t 2, then d 80, if t 3, d 120 and so on. The pair of numbers 1 and 40, examined together, is called the solution of the equation d 40r, because when we replace 1 for t and 40 for d in the equation, we get a true statement. If we agree to refer to doubles in the specified order, in which the first number refers to time and the second number refers to distance, we can shorten the above decisions as (1, 40), (2, 80), (3, 120) and so on. We call these pairs of numbers in orderly pairs, and we refer to the first and second numbers in pairs as components. In this agreement, the solution to the equation d - 40t is ordered in pairs (t, d), the components of which satisfy the equation. Some ordered pairs for t equal 0, 1, 2, 3, 4, and 5 (0.0), (1.40), (2.80), (3.120), (4,160), and (5,200) Such matings are sometimes shown in one of the following tabular forms. In any particular equation that includes two variables, when we assign the value of one of the variables, the value for the other variable is determined and therefore dependent on the first. It is convenient to talk about the variable associated with the first component of the ordered pair as an independent variable and variable associated with the second component of the ordered pair as a dependent variable. If the x and y variables are used in the equation, it is clear that cop replacements for x are the first components and therefore x is an independent variable, and y replacements are the second components and therefore y is a dependent variable. For example, we can get pairings for the equation by replacing a certain value of one variable with an equation (1) and deciding for another variable. Example 1 Find the missing component so that the orderly pair is the solution for 2x and y 4 a. (0,?) b. (1,?) c. (2,?) Solution if x y 0, then 2 (0) y 4 y 4, if x y 1, then 2 (1) y 4 y 2, if x y 2, then 2 (2) y 4 y 0 Three now can be displayed as three in three pairs (0.4), (1.2), and (2.0) or in tablicular forms EXPRESSING A VARIABLE EXPLICITLY We can add -2x for both members 2x and y 4, to get -2x - 2x - y -2x - 4 y -2x - 4 in equation (2), where y in itself, we say that y is expressed explicitly in terms of x. It is often easier to find solutions if the equations are first expressed in this form, because the dependent variable is expressed explicitly in terms of an independent variable. For example, in Equation (2) above, if x No 0, then -2 (0) 4 and 4, if x No. 1, then -2 (1) - 4 x 2, if x 2, then -2 (2) - 4 and 0 We get the same pairs that we got using equation (1) (0) (0 .4), (1.2) and (2.0) We got the equation (2), adding the same number, -2x, to each member of the Equation (1), thus getting y by itself. In general, we can write equivalent equations in two variables using properties that we typed in Chapter 3, where we solved first-degree equations in one variable. Equations are equivalent if the same amount is added or deducted from equal quantities. Equal amounts are multiplied or divided into the same non-grain amount. Example 2 Solve 2y - 3x No 4 is clearly for y in terms of x and get solutions for x y 0, x y 1, and x 2. First, by adding 3x to each member, we get 2y - 3x - 3x - 4x - 4x - 3x (continued) Now, dividing each member into 2, we get In this form we get y values for these x values as follows: In this case, three solutions (0, 2), (1, 7/2), and (2, 5). FUNCTION NOTATION Sometimes we use a special notation to name the second component of the ordered pair, which is paired with the specified first component. The f(x) symbol, which is often used to refer to algebraic expression in variable x, can also be used to refer to the meaning of expression for specific x values. that in Equation (2) on page 285, then f(1) represents expression value -2x No. 4, when x is replaced by 1 f(l) -2(1) - 4 - 2 Similarly, f (0) - -2 (0) - 4 and f(2) -2 (2) - 4 x 0 Symbol F (x) commonly called function. Example 3 If f (x) -3x and 2, find f (-2) and f(2). The solution replace x with -2 to get f (-2) - -3 (-2) - 2 8 Replacement x with 2 to get f(2) -3 (2) - 2 -4 7.2 GRAPHS ORDERED PAIRS In section 1.1, we saw that each number corresponds to the point in the line. Simi-larli, each ordered pair of numbers (x, y) corresponds to the point in the plane. To chart an orderly pair of numbers, we start by building a pair of perpendicular lines of numbers called amies. The horizontal axis is called x-axis, the vertical axis is called the axis, and their point of intersection is called origin. These axis divide the plane into four quadrants, as shown in figure 7.1. Now we can assign an orderly pair of dot numbers to the plane, referring perpendicular to the point distance from each of the axes. If the first component is positive, the point lies to the right of the vertical axis; if negative, it lies to the left. If the second component is positive, the point lies above the horizontal axis; if negative, it lies below. Example 1 Graph (3, 2), (-3, 2), (-3, -2) and (3, -2) on a rectangular coordinate system. The Solution Schedule (3, 2) lies 3 units to the right of the axis and 2 units above the x-axis; The graph (-3,2) lies 3 units to the left of the axis and 2 units above the x-axis; Graph (-3, -2) lies 3 units to the left of the axis and 2 units below the x-axis; graph (3, -2) lies 3 units to the right of the axis and 2 units below the x-axis. The distance y that point is located from the x-axis is called the order of the point, and the distance x that point is located from the y-axis called abscissa point. Abschissa and order together are called rectan-ular or Cartesian coordinates of the point (see figure 7.2). 7.3 GRAPHING FIRST-DEGREE EQUATIONS In section 7.1, we saw that the solution to the equation in two variables is an orderly pair. In section 7.2, we saw that the components of the ordered pair are the coordinates of the point in the plane. So to chart the equation into two variables, we graph a set of orderly pairs that are the solutions to the equation. For example, we can find some solutions to the first-degree equation x x x 2, allowing x to equal 0, -3, -2 and 3. Then, for x 0, 0 x 2 2 for x 0, y -3 - 2 - -1 for x -2, y -2 - 2 - 0 for x 3, y 3 - 2 - 5, and we get solutions (0.2), (-3,-1), (-2.0), and (3.5), which can be shown in tablicular form, as shown below. If we graph the points defined by these orderly pairs and pass a straight line through them, we get a graph of all the solutions in th x x 2, as shown in figure 7.3. That is, every decision y y y 2 lies on the line, and every point on the line is the solution in x x 2. First-degree equations in two variables are always straight lines; therefore, such equations are also called linear equations. In the example above, the values used for x were randomly selected; we could use any x values to find solutions to the equation. Charts of any other orderly pairs that are the solutions to the equation will also be on the line shown in figure 7.3. In fact, each linear equation in two variables has an infinite number of solutions, the graph of which lies on the line. However, we only need to find two solutions, because only two points are needed to define a straight line. The third item can be obtained as a check. For the first-degree equation graph: Create a set of rectangular axes showing the scale and variable sent to each axis. Find two orderly pairs that are the solutions to the equation graph by assigning any convenient value to one variable and determining the value of corred-sponding by another variable. Schedule these orderly pairs. Draw a straight line through the dots. Check by writing the third pair ordered, which is the solution to the equation, and make sure it lies on the line. Example 1 Equation graph y 2x - 6. Solution We first select any two x values to find related values y. We will use 1 and 4 for x. If x No. 1, y 2(1) - 6 -4, if x No. 4, y 2 (4) - 6 and 2 Thus, two equation solutions (1, -4) and (4, 2). Next, we'll draw these orderly pairs and draw a straight line through the dots, as shown in the picture. We use arrowheads to show that the line extends infinitely far in both directions. Any third pair ordered that satisfies the equation can be used as a check: if x No. 5, 2(5) -6 and 4 We then note that the graph (5, 4) also lies on the line to find solutions to the equation, as we have already noted that it is often the easiest to first solve explicitly for y in terms of x. Example 2 Chart x y 2y 4. The solution that we first solve for y in terms of x to get We now select any two x values to find related values y. We will use 2 and 0 for x. So two equation solutions (2, 1) and (0, 2). Next we graph these ordered pairs and go straight through the dots, as shown in the picture. Any third pair ordered that satisfies the equation can be used as a check: Then we note that the graph (-2, 3) also lies on the line. SPECIAL CASES OF LINEARS Equations Equation y No. 2 can be written as 0x and y 2 and can be considered a linear equation in two variables where the x ratio is 0. Some 0x and y 2 solutions are (1,2), (-1.2), and (4.2) In fact, any pair ordered form (x, 2) is the solution (1). The solution graph gives a horizontal line, as shown in figure 7.4. Similarly, an equation such as x -3 can be written as x -0y -3 and can be considered a linear equation in two variables where the y factor is 0. Some solutions x 0y -3 are (-3, 5), (-3, 1), and (-3, -2). In fact, any pair ordered form (-3, y) is the solution (2). The solution graph gives a vertical line, as shown in figure 7.5. Example 3 Chart a. y 3 b. x'2 Solution a. We can write y No. 3, like Bull and at No. 3. Some solutions (1, 3), (2,3) and (5, 3). B. We can write x No. 2 as x oy No 2. Some solutions (2, 4), (2, 1), and (2, -2). 7.4 INTERCEPT METHOD OF GRAPHING In section 7.3, we assigned x values in equations in two variables to find the corresponding y values. For example, if we replace 0 per x in 3x and 4y 12, we have 3 (0) and 4y 12 y 3 thus solution Equation (1) (0, 3). We can also find ordered which are the solutions to equations in two variables by assigning values to u and determining the corresponding x values. We can now use orderly pairs (0, 3) and (4, 0) for the equation graph (1). The graph is shown in figure 7.6. Note that the line crosses the x-axis on 4 and at the axis by 3. For this reason, the number 4 is called x-intercept graphics, and the number 3 is called y-intercept. This method of drawing a linear equation graph is called the method of intercepting graphics. Note that when we use this method of graphing the linear equation, there is no advantage in the first expression clearly from the point of view x. Example 1 Graph 2x - y No. 6 by the method of interception. Solution We find x-interception, replacing 0 for y in the equation to get 2x - (0) 6 2x and 6 x 3 Now, we find y-interception by replacing for x in level to get 2(0) - y y 6 -y 6 y -6 said pairs (3, 0) and (0, -6) resolution 2x - y 6. The graph of these points and the connection of them with the straight line give us a graph of 2x - y No 6. If the graph crosses the axis at or near the source, the interception method is not satisfactory. We then have to chart an orderly pair, which is the solution to the equation and whose graph is not origin or not too close to origin. Example 2 Chart y 3x. Solution We can replace 0 for x and find y 3 (0) y 0 In a similar way, replacing 0 for y, we get 0 y 3.x, x 0 Thus, 0 is both x-interception and y-interception. Since one paragraph is not enough for schedule 3x, we resort to the methods outlined in section 7.3. By choosing any other value for x,say 2, we get y 3(2) 6 So (0, 0) and (2, 6) are the solutions to the equation. The graph y y 3x is shown on the right. 7.5 SLOPE OF A LINE SLOPE FORMULA In this section we will be aware of the important property of the line. We will assign a line number, which we call tilt, which will give us a measure of coolness or direction of the line. It is often convenient to use a special notation to distinguish between the rectan-ular coordinates of two different points. We can assign one pair of coordinates (x1, y1 (read x sub one, y sub one) associated with P1, and the second pair of coordinates (x2, y2) associated with the second P2 point, as shown in figure 7.7. Note in figure 7.7 that when moving from P1 to P2, vertical change (or vertical distance) between two y2 points - y1 and horizontal change (or horizontal distance) x2 - x1. containing P1 and P2 points. This ratio is usually denoted m. So example 1 Find a tilt line containing two coordinate points (-4, 2) (3, 5), as shown in the picture on the right. Solution We designate (3, 5) as (x2, y2) and (-4, 2) as (x1, y1). Replacement in Equation (1) gives note that we get the same result if we subsitute -4 and 2 for x2 and y2 and 3 and 5 for x1 and y1 Lines with different slopes shown in figure 7.8 below. The slopes of the lines that go up to the right are positive (figure 7.8a) and the slopes of the lines that go down to the right are negative (Figure 7.8b). And note (figure 7.8c) that since all the dots on the horizontal line have the same value y, y2 - y1 is zero for any two points and the slope of the line is just also noteworthy (figure 7.8c) that since all vertical points have the same value x, x2 - x1 is zero for any two points. However, it is not defined, so the vertical line has no slope. PARALLEL AND PERPENDICULAR LINE Consider the lines shown in Figure 7.9. The L1 line has a tilt of m1 No. 3, and the L2 line has a slope of M2 and 3. In this case, these lines will never cross and are called parallel lines. Now let's look at the lines shown in figure 7.10. The l1 line has a slope of m1 No 1/2 and the L2 line has a tilt of M2 and -2. In this case, these lines are met to form a straight angle and are called perpendicular lines. In general, if two lines have slopes and m2: a. The lines are parallel if they have the same inclination, that is, if m1 and m2. B. Lines are perpendicular If the product of their slopes is -1, that is, if m1 and m2 -1. 7.6 EQUATIONS OF STRAIGHT LINES POINT-SLOPE FORM In Section 7.5 we found a straight line tilt using the Formula Let's Say We Know that the line passes through point (2, 3) and has a tilt 2. If we designate any other point on the line as P (x, y) (see figure 7.1 la), according to the tilt formula Thus, the equation (1) is a line equation that passes through the point (2, 3) and has a slope of 2. In general, let's assume that we know that the line passes through point P1 (x1, y1 and has a slope M. If we designate any other point on the line as P (x, y) (see figure 7.11 b), then according to the tilt formula Equation (2) is called the form of a tonic tilt for the linear equation. So whenever we know the slope of the line and the point on the line, we can find the line equation using equation (2). Example 1 Line A has a slope -2 and passes through the point (2, 4). , the line with a slope of -2, which passes through the point (2, 4) has an equation of y -2x 8. We could also write an equation in equivalent forms y - 2x - 8, 2x - y 8, or 2x - 8 and 0. SLOPE-INTERCEPT FORM Now consider the equation of the line with tilt m and u-interception b, as shown in figure 7.12. Replacing 0 by x1 and b by y1 in toxins of the linear equation, we have y - b q m (x - y - b - mx or y mx b Equation (3) is called a tilt interception form for linear equation. The slope and y-interception can be obtained directly from the equation in this form. Example 2 If the line has an equation, the slope of the line should be -2, and the u-interception should be 8. Similarly, the schedule of -3x No. 4 has a slope of -3 and y-interception 4; and the chart has a slope of 1/4 and y-interception -2. If the equation is not written in the form of x and mx b, and we want to know the slope and/or u-interception, we rewrite the equation, solving for y in terms of x. Example 3 Find the slope and u-interception 2x - 3y and 6. The solution that we first solve for y in terms of x, adding -2x to each member. 2x - 3y - 2x - 6 - 2x - 3y - 6 - 2x Now dividing each member into -3, we have a comparison of this equation with the form y q mx b, we note that the tilt m (x ratio) is 2/3, and u-interception is equal -2. 7.7 DIRECT VARIATION A special case of first-degree equation in two variables is given y q kx (k is a constant) This link is called direct change. We say that the y variable changes directly as x. Example 1 We know that the pressure of P in the liquid changes directly as the depth d below the surface of the liquid. We can recognize this link in characters like P q kd In direct change, if we know the set of conditions on two variables, and if we further know the other value for one of the variables, we can find the value of the second variable for this new set of conditions. In the above example, we can decide for a permanent k to get Since the P/d ratio is permanent for each set of conditions, we can use proportion to solve problems associated with direct change. Example 2 If the pressure P changes directly as the depth of D, and P No. 40, when d No. 10, find P when d No. 15. Solution Since the P/d ratio is permanent, we can replace the values P and D and get the proportion thus P 60 when d and 15. 7.8 INEQUALITIES IN TWO VARIABLES In sections 7.3 and 7.4 we're on the equation graph in two variables. In this section we are on a graph of inequality in two variables. For example, consider the inequality of y ≤ -x No. 6 Solutions are ordered pairs of numbers that satisfy inequality. That is, a, b) is the solution to inequality, if inequality is the true statement after we replace x and b for y. Example 1 Determine whether the given of the couple ordered is a decision y -x No 6. a. (1, 1) b. (2, 5) Solution Ordered pair (1, 1) is a solution, because when 1 is replaced by x and 1 is replaced by y, we get (1) -(1) - 6, or 1 No 5, which is the true statement. On the other hand, (2, 5) is not a solution, because when 2 is replaced by x and 5 is replaced by y, we get (5) -(2) 6, or 5 No. 4, which is a false statement. To chart the disparity in the 6th, we first graph the equation at -x 6 shown Please note that (3, (3, (3, 2), (3, 1), (3, 0) and so on, associated with points that are at or below the line, all inequality solutions in the 6th, while (3,4), (3, 5), and (3.6) associated with points above the line are not solutions to inequality. In fact, all orderly pairs associated with dots at or below the line are solutions y - x 6. Thus, each point on or below the line is on the graph. We imagine this by shading the area below the line (see figure 7.14). In general, to chart first-degree inequality in two Ax variables - by - C or Ax - by C, we first chart the Ax and C equation and then determine which half of the plane (the area above or below the line) contains solutions. Then we shade this semi-plane. We can always determine which half of the plane to shade by selecting a point (not on the Ax and C equation line) and testing to see if an orderly pair associated with a point is the solution to this inequality. If so, we shade the floor of the plane containing the test point; otherwise, we shade the other half of the plane. Often (0, 0) is a convenient testing point. Example 2 Chart 2x'3y No 6 Solution We first chart line 2x and 3y y 6 (see chart a). Using origin as a test point, we determine whether (0, 0) 2x and 3y ≥ 6. Since statement 2(0) and 3(0) 6 is false, (0, 0) is not a solution and we shade the floor of a plane that does not contain origin (see graph b). When the Ax and C line passes through origin, (0, 0) is not a valid test point, as it is on the line. Example 3 Chart at 2x. Solution We start with a line chart of y and 2x (see chart a). Since the line goes through the beginning, we have to choose a different point rather than on the line as our test point. We will use (0, 1). Since the statement (1) No. 2(0) is true, (0, 1) is the solution and we shade the floor plane that contains (0, 1) (see graph b). If the symbol of inequality is the lt or qgt; the points on the Ax and C charts are not solutions to inequality. We then use the dotted line for the Ax graph and by C. CHAPTER SUMMARY The solution to the equation in two variables is an orderly pair of numbers. In the pair ordered (x, y) x is called the first component, and the second component is called the second component. For an equation in two variables, the variable associated with the first component of the solution is called an independent variable, and the variable associated with the second component is called a dependent variable. The f(x) notation function is used for the name of algebraic expression in x. When x in the f(x) symbol is replaced by a certain value, the symbol represents the meaning of expression for that value x. Crossing two perpendicular axes in the coordinate system is called the origin of the system, and each of the four areas in which the plane is divided, квадрантом. (x, y) y) The coordinates of the point are called with a point point in the plane. x is called abscissa points and u is called the order of the point. The first-degree equation graph in two variables is a straight line. That is, each orderly pair, which is the solution to the equation, has a graph that lies in the line, and each point in the line is connected to the ordered pair, which is the solution to the equation. Graphs of any two equation solutions in two variables can be used to produce a graph of the equation. However, the two solutions are the equations in two variables, which are usually the easiest to find those in which either the first or second component is 0. The X-coordinates of the point where the line crosses the x-axis is called the x-interception line, and the u-coordinate point where the line crosses off the axis is called an on-the-cross line. Using interceptions for the equation graph is called the graphics interception method. The tilt of the line containing P1 points (x1, y1) and P2 (x2, y2) is given by two lines parallel if they have the same inclination (m1 and m2). Two lines are perpendicular if the product of their slopes is L (m1 - m2 and -1). The shape of the tosad line with the slope M and passing through the point (x1, y1) is y - y1 - y1 - m(x - x1) Slope-interception of the form of the line with a slope M and y-intercept b y mx b ratio, defined by the equation of form y q kx (k a constant) is called a direct change. The solution to inequality in the two variables is an orderly pair of numbers, which, when replaced by inequality, makes inequality a true statement. The graph of linear inequality in two variables is the semi plane. The symbols in this chapter appear on the inside covers. Covers. mathswatch scatter graph answers. maths genie straight line graph answers. maths genie velocity time graph answers. 10th maths graph 3.15 answers. discrete mathematics graph theory questions and answers. 10th maths graph 10.2 answers. 10th maths graph 10.1 answers. maths genie graph transformations answers