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Math graph answers

Three years ago, I wrote a post about Photomath, a software capable of scanning and solving equations using phone cameras. I haven't used the software in a while, and recently discovered that it also has added a capability of graphing functions. It can now graph polynomial functions, rational functions, and trigonometric functions, exponential functions, and logarithmic functions. Recent improvements also allows solving for exponential equations, derivative, integrals, and limits. Shown below are some examples. I scanned handwritten equations of functions and graph them. To use Photomath, just open it, click the Camera icon and point to then expression or equation. To view the graph, click the red rectangle containing the equation at the bottom of the screen. Aside from the graph, the output also shows some important information about the function such as its x and y intercepts, domain, minima/maxima. I think Photomath is a very good software that can be used for learning mathematics. Students can use this app to verify answers and also to explore graphs. Photomath is a free app and is both available on Android and iOS. When you open the Create Custom Question wizard, choose to start with an empty template. Select Left/Right as the format and click Next. Delete the placeholder text in the problem statement area on the left and click Graph in the left menu.The Edit Graph window appears. On the Graph tab, choose Large as the graph size and keep all other default settings. Click Next. On the X-Axis and Y-Axis tabs, make the following settings to create a 6 by 6 grid: Minimum: Enter -6.Maximum: Enter 6.Select Label Minimum and Maximum to label only the minimum and maximum values. On the Plots tab, click Add > Linear to graph a linear equation. The formula for your graph appears in the table. Enter the values for the formula in the boxes below the table: To make the line red, click on the Color box and select red from the left column (code ff0000). On the Alt Text tab page, enter a brief description of the graph for students using screenreaders. The preview of your graph should look something like this: Click Save to add your graph to the question. In the interaction area on the right, delete the placeholder text and enter: Find the coordinates of the y-intercept and of the x-intercept of the line displayed on the left. On a new line, enter: What is the y-intercept? Put your cursor on the next line and click Short Answer to create the answer. In the Edit Answer Definition window, do the following: Step 1: Select Specify a subset of equivalent answers to accept and Accept similar answer or algebraic function.Step 2: Click into the first row under Value and enter the coordinates: (0,~M). Select The correct answer(s) are ordered pairs. Step 3: Leave all settings as the defaults.Step 4: Enter the following incorrect answer feedback: To locate the y-intercept of the line, find the coordinates of the point where the line intersects the y-axis. To locate the x-intercept of the line, find the coordinates of the point where the line intersects the x-axis. Be sure to type the coordinates as ordered pairs.Click Save. On a new line, enter: What is the x-intercept? Put your cursor on the next line and click Short Answer to create the answer. In the Edit Answer Definition window, do the following: Step 1: Select Specify a subset of equivalent answer to accept and Accept similar answer or algebraic function.Step 2: Click into the first row under Value and enter the coordinates: (~N,0). Select The correct answer(s) are ordered pairs. Step 3: Leave all settings as the defaults.Step 4: Enter the following incorrect answer feedback:To locate the x-intercept of the line, find the coordinates of the point where the line intersects the x-axis.Click Save. Enter tips under each answer box to remind your students that the answers are ordered pairs: Under the first short answer box, enter:(Type an ordered pair.)Make the text gray by selecting the tip, clicking the text color icon (), and choosing dark gray from the palette.Highlight the tip, right-click on it, and select Copy from the popup menu.On a new line under the second answer, right-click and select Paste to copy the tip. Click Regenerate Values in the algorithmic values toolbar to make sure that your question is working properly. Click Preview Exercise in the formatting toolbar to see how the question will appear to your students. When you are satisfied with your question, dismiss the Preview window and click Save. In the previous section, we found several solutions to the equation \(3x+2y=6\). They are listed in Table \(\PageIndex{1}\). So, the ordered pairs (0,3), (2,0), and \((1,\frac{3}{2})\) are some solutions to the equation \(3x+2y=6\). We can plot these solutions in the rectangular coordinate system as shown in Figure \(\PageIndex{1}\). Table \(\PageIndex{1}\) 3x+2y=6 x y (x,y) 0 3 (0,3) 2 0 (2,0) 1 \(\frac{3}{2}\) \((1, \frac{3}{2})\) Figure \(\PageIndex{1}\) Notice how the points line up perfectly? We connect the points with a line to get the graph of the equation 3x+2y=6. See Figure \(\PageIndex{2}\). Notice the arrows on the ends of each side of the line. These arrows indicate the line continues. Figure \(\PageIndex{2}\) Every point on the line is a solution of the equation. Also, every solution of this equation is a point on this line. Points not on the line are not solutions. Notice that the point whose coordinates are (−2,6) is on the line shown in Figure \(\PageIndex{3}\). If you substitute x=−2 and y=6 into the equation, you find that it is a solution to the equation. Figure \(\PageIndex{3}\) So the point (−2,6) is a solution to the equation \(3x+2y=6\). (The phrase "the point whose coordinates are (−2,6)" is often shortened to "the point (−2,6).") Figure \(\PageIndex{3}\). This is an example of the saying, "A picture is worth a thousand words." The line shows you all the solutions to the equation. Every point on the line is a solution of the equation. And, every solution of this equation is on this line. This line is called the graph of the equation \(3x+2y=6\). GRAPH OF A LINEAR EQUATION The graph of a linear equation Ax+By=C is a line. Every point on the line is a solution of the equation. Every solution of this equation is a point on this line. Exercise \(\PageIndex{1}\) The graph of y=2x−3 is shown. For each ordered pair, decide: Is the ordered pair a solution to the equation? Is the point on the line? A (0,−3) B (3,3) C (2,−3) D (−1,−5) Answer Substitute the x- and y- values into the equation to check if the ordered pair is a solution to the equation. 1. 2. Plot the points A (0,3), B (3,3), C (2,−3), and D (−1,−5). The points that are solutions to y=2x−3 are on the line, but the point that is not a solution is not on the line. The points (0,3), (3,3), and (−1,−5) are on the line y=2x−3, and the point (2,−3) is not on the line. Exercise \(\PageIndex{2}\) Use the graph of y=3x−1 to decide whether each ordered pair is: a solution to the equation. on the line. Answer Exercise \(\PageIndex{3}\) Use graph of y=3x−1 to decide whether each ordered pair is: a solution to the equation on the line Answer There are several methods that can be used to graph a linear equation. The method we used to graph 3x+2y=6 is called plotting points, or the Point–Plotting Method. Exercise \(\PageIndex{4}\): How To Graph an Equation By Plotting Points Graph the equation y=2x+1 by plotting points. Answer Exercise \(\PageIndex{5}\) Graph the equation by plotting points: y=2x−3. Answer Exercise \(\PageIndex{6}\) Graph the equation by plotting points: y=−2x+4. Answer The steps to take when graphing a linear equation by plotting points are summarized below. GRAPH A LINEAR EQUATION BY PLOTTING POINTS Find three points whose coordinates are solutions to the equation. Organize them in a table. Plot the points in a rectangular coordinate system. Check that the points line up. If they do not, carefully check your work. Draw the line through the three points. Extend the line to fill the grid and put arrows on both ends of the line. It is true that it only takes two points to determine a line, but it is a good habit to use three points. If you only plot two points and one of them is incorrect, you can still draw a line but it will not represent the solutions to the equation. It will be the wrong line. If you use three points, and one is incorrect, the points will not line up. This tells you something is wrong and you need to check your work. Look at the difference between part (a) and part (b) in Figure \(\PageIndex{4}\). Figure \(\PageIndex{4}\) Let's do another example. This time, we'll show the last two steps all on one grid. Exercise \(\PageIndex{7}\) Graph the equation y=−3x. Answer Find three points that are solutions to the equation. Here, again, it's easier to choose values for x. Do you see why? We list the points in Table \(\PageIndex{2}\). Table \(\PageIndex{2}\) y=−3x x y (x,y) 0 0 (0,0) 1 −3 (1,−3) −2 6 (−2,6) Plot the points, check that they line up, and draw the line. Exercise \(\PageIndex{8}\) Graph the equation by plotting points: y=−4x. Answer Exercise \(\PageIndex{9}\) Graph the equation by plotting points: y=x. Answer When an equation includes a fraction as the coefficient of x, we can still substitute any numbers for x. But the math is easier if we make 'good' choices for the values of x. This way we will avoid fraction answers, which are hard to graph precisely. Exercise \(\PageIndex{10}\) Graph the equation \(y = \frac{1}{2}x + 3\). Answer Find three points that are solutions to the equation. Since this equation has the fraction \(\frac{1}{2}\) as a coefficient of x, we will choose values of x carefully. We will use zero as one choice and multiples of 2 for the other choices. Why are multiples of 2 a good choice for values of x? The points are shown in Table \(\PageIndex{3}\). Table \(\PageIndex{3}\) y=12x+3 x y (x,y) 0 3 (0,3) 2 4 (2,4) 4 5 (4,5) Plot the points, check that they line up, and draw the line. Exercise \(\PageIndex{11}\) Graph the equation \(y = \frac{1}{3}x - 1\). Answer Exercise \(\PageIndex{12}\) Graph the equation \(y = \frac{1}{4}x + 2\). Answer So far, all the equations we graphed had y given in terms of x. Now we'll graph an equation with x and y on the same side. Let's see what happens in the equation 2x+y=3. If y=0 what is the value of x? This point has a fraction for the x- coordinate and, while we could graph this point, it is hard to be precise graphing fractions. Remember in the example y=12x+3, we carefully chose values for x so as not to graph fractions at all. If we solve the equation 2x+y=3 for y, it will be easier to find three solutions to the equation. \[\begin{aligned} 2 x+y &=3 \\ y &=-2 x+3 \end{aligned}\] The solutions for x=0, x=1, and x=−1 are shown in the Table \(\PageIndex{4}\). The graph is shown in Figure \(\PageIndex{5}\). Table \(\PageIndex{4}\) 2x+y=3 x y (x,y) 0 3 (0,3) 1 1 (1,1) −1−1 5 (−1,5) Figure \(\PageIndex{5}\) Can you locate the point \((\frac{3}{2}, 0)\) which we found by letting y=0, on the line? Exercise \(\PageIndex{13}\) Graph the equation 3x+y=−1. Answer \(\begin{array}{lrl} { \text { Find three points that are solutions to the equation. } } & {3 x+y} &{=} &{-1} \\ {\text { First solve the equation for } y.} &{y} &{=} &{-3 x-1} \end{array}\) We'll let x be 0, 1, and −1 to find 3 points. The ordered pairs are shown in Table \(\PageIndex{5}\). Plot the points, check that they line up, and draw the line. See Figure \(\PageIndex{6}\). Table \(\PageIndex{5}\) 3x+y=−1 x y (x,y) 0 −1 (0,−1) 1 −4 (1,−4) −1 2 (−1,2) Figure \(\PageIndex{6}\) Exercise \(\PageIndex{14}\) Graph the equation 2x+y=2. Answer Exercise \(\PageIndex{15}\) Graph the equation 4x+y=−3. Answer If you can choose any three points to graph a line, how will you know if your graph matches the one shown in the answers in the book? If the points where the graphs cross the x- and y-axis are the same, the graphs match! The equation in Exercise \(\PageIndex{13}\) was written in standard form, with both x and y on the same side. We solved that equation for y in just one step. But for other equations in standard form it is not that easy to solve for y, so we will leave them in standard form. We can still find a first point to plot by letting x=0 and solving for y. We can plot a second point by letting y=0 and then solving for x. Then we will plot a third point by using some other value for x or y. Exercise \(\PageIndex{16}\) Graph the equation \(2x−3y=6\). Answer \(\begin{array}{lrl} \text { Find three points that are solutions to the } & 2 x-3 y &= &6 \\ \text { equation. } & 2 x-3 y&=&6 \\ \text { First let } x=0 . & 2(0)-3 y&=&6 \\ \text { Solve for } y . &-3 y&=&6 \\ & y&=&-2 \\\\ \text { Now let } y=0 . & 2 x-3(0)&=&6 \\ \text { Solve for } x . & 2 x&=&6 \\ & x&=& 3 \\ \\ \text{ We need a third point. Remember, we can}&2(6)-3 y &=&6 \\ \text{ choose any value for x or y. We'll let x = 6.}&12-3 y &=&6 \\ \text{ Solve fory.}&-3 y &=&-6 \\ &y &=&2\end{array}\) We list the ordered pairs in Table \(\PageIndex{6}\). Plot the points, check that they line up, and draw the line. See Figure \(\PageIndex{7}\). Table \(\PageIndex{6}\) 2x−3y=6 x yT (x,y) 0 −2 (0,−2) 3 0 (3,0) 6 2 (6,2) Figure \(\PageIndex{7}\) Exercise \(\PageIndex{17}\) Graph the equation \(4x+2y=8\). Answer Exercise \(\PageIndex{18}\) Graph the equation \(2x−4y=8\). Answer Can we graph an equation with only one variable? Just x and no y, or just y without an x? How will we make a table of values to get the points to plot? Let's consider the equation x=−3. This equation has only one variable, x. The equation says that x is always equal to −3, so its value does not depend on y. No matter what y is, the value of x is always −3. So to make a table of values, write −3 in for all the x values. Then choose any values for y. Since x does not depend on y, you can choose any numbers you like. But to fit the points on our coordinate graph, we'll use 1, 2, and 3 for the y-coordinates. See Table \(\PageIndex{7}\) Table \(\PageIndex{7}\) x=−3 x y (x,y) −3 1 (−3,1) −3 2 (−3,2) −3 3 (−3,3) Plot the points from Table \(\PageIndex{7}\) and connect them with a straight line. Notice in Figure \(\PageIndex{8}\) that we have graphed a vertical line. Figure \(\PageIndex{8}\) VERTICAL LINE A vertical line is the graph of an equation of the form x=a. The line passes through the x-axis at (a,0). Exercise \(\PageIndex{19}\) Graph the equation x=2. Answer The equation has only one variable, x, and x is always equal to 2. We create Table \(\PageIndex{8}\) where x is always 2 and then put in any values for y. The graph is a vertical line passing through the x-axis at 2. See Figure \(\PageIndex{9}\). Table \(\PageIndex{8}\) x=2 x y (x,y) 2 1 (2,1) 2 2 (2,2) 2 3 (2,3) Figure \(\PageIndex{9}\) Exercise \(\PageIndex{20}\) Graph the equation x=5. Answer Exercise \(\PageIndex{21}\) Graph the equation x=−2. Answer What if the equation has y but no x? Let's graph the equation y=4. This time the y- value is a constant, so in this equation, y does not depend on xx. Fill in 4 for all the y's in Table \(\PageIndex{9}\) and then choose any values for x. We'll use 0, 2, and 4 for the x-coordinates. Table \(\PageIndex{9}\) y=4 x y (x,y) 0 4 (0,4) 2 4 (2,4) 4 4 (4,4) The graph is a horizontal line passing through the y-axis at 4. See Figure \(\PageIndex{10}\). Figure \(\PageIndex{10}\) HORIZONTAL LINE A horizontal line is the graph of an equation of the form y=b. The line passes through the y-axis at (0,b). Exercise \(\PageIndex{22}\) Graph the equation y=−1. Answer The equation y=−1y=−1 has only one variable, y. The value of y is constant. All the ordered pairs in Table \(\PageIndex{10}\) have the same y-coordinate. The graph is a horizontal line passing through the y-axis at −1−1, as shown in Figure \(\PageIndex{11}\). Table \(\PageIndex{10}\) y=−1 x y (x,y) Ta−1 (0,−1) −1 (3,−1) −3 −1 (−3,−1) Figure \(\PageIndex{11}\) Exercise \(\PageIndex{23}\) Graph the equation y=−4. Answer Exercise \(\PageIndex{24}\) Graph the equation y=3. Answer The equations for vertical and horizontal lines look very similar to equations like y=4x. What is the difference between the equations y=4x and y=4? The equation y=4x has both x and y. The value of y depends on the value of x. The y-coordinate changes according to the value of x. The equation y=4 has only one variable. The value of y is constant. The y-coordinate is always 4. It does not depend on the value of x. See Table \(\PageIndex{11}\). Table \(\PageIndex{11}\) y=4x y=4 x y (x,y) x y (x,y) 0 0 (0,0) 0 4 (0,4) 1 4 (1,4) 1 4 (1,4) 2 8 (2,8) 2 4 (2,4) Figure \(\PageIndex{12}\) Notice, in Figure \(\PageIndex{12}\), the equation y=4x gives a slanted line, while y=4 gives a horizontal line. Exercise \(\PageIndex{25}\) Graph y=−3x and y=−3 in the same rectangular coordinate system. Answer Notice that the first equation has the variable x, while the second does not. See Table \(\PageIndex{12}\). The two graphs are shown in Figure \(\PageIndex{13}\). Table \(\PageIndex{12}\) y=−3x y=−3 x y (x,y) x y (x,y) (0,0) −3 (0,−3) −3 (1,−3) −3 (1,−3) −6 (2,−6) −3 (2,−3) Figure \(\PageIndex{13}\) Exercise \(\PageIndex{26}\) Graph y=−4x and y=−4 in the same rectangular coordinate system. Answer Exercise \(\PageIndex{27}\) Graph y=3 and y=3x in the same rectangular coordinate system. Answer mathswatch scatter graph answers. maths genie velocity time graph answers. mathswatch graph answers. mathswatch straight line graph answers. mathswatch velocity time graph answers. maths genie scatter graphs answers. 10th maths graph 3.15 answers. discrete mathematics graph theory questions and answers

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