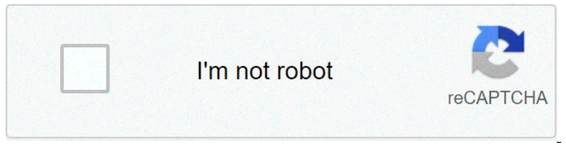

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How to write an equation in slope intercept form without a graph

We can use the skills of solving for a variable to change any linear equation into slope-intercept form. All that is required is that we solve for \({\text{y}}\) then arrange them so that the term with \({\text{x}}\) in it comes first. Linear equation = an equation that is a straight line when graphed Video Source (10:29 mins) | Transcript Remember, the key to converting a linear equation to slope-intercept form is to solve for \({\text{y}}\) using the tools we learned in PC 101 Weeks 11 and 12. Solving for a variable is used when analyzing data. Additional Resources Khan Academy: Converting to Slope-Intercept Form (05:07 mins, Transcript) Change the following equations into the slope-intercept form of a line: \({\text{y}}+14=-4{\text{x}}\) \({\text{y}}-7 = \frac{1}{3}{\text{x}}\) \({\text{y}} + \frac{3}{8} = \frac{1}{8}{\text{x}}\) \({\text{x}}=\frac{{\text{y}}+36}{9}\) \(-6{\text{x}}-2{\text{y}}=-7\) \(3{\text{x}}-2{\text{y}}=-1\) Recognize the Relation Between the Graph and the Slope–Intercept Form of an Equation of a Line In the following exercises, use the graph to find the slope and y-intercept of each line. Compare the values to the equation . slope and y-intercept slope and y-intercept slope and y-intercept Identify the Slope and y-Intercept From an Equation of a Line In the following exercises, identify the slope and y-intercept of each line. Graph a Line Using Its Slope and Intercept In the following exercises, graph the line of each equation using its slope and y-intercept. Choose the Most Convenient Method to Graph a Line In the following exercises, determine the most convenient method to graph each line. Graph and Interpret Applications of Slope–Intercept The equation models the relation between the amount of Tuyet’s monthly water bill payment, P, in dollars, and the number of units of water, w, used. Find Tuyet’s payment for a month when 0 units of water are used. Find Tuyet’s payment for a month when 12 units of water are used. Interpret the slope and P-intercept of the equation. Graph the equation. The equation models the relation between the amount of Randy’s monthly water bill payment, P, in dollars, and the number of units of water, w, used. Find the payment for a month when Randy used 0 units of water. Find the payment for a month when Randy used 15 units of water. Interpret the slope and P-intercept of the equation. Graph the equation. ?28 ?66.10 The slope, 2.54, means that Randy’s payment, P, increases by ?2.54 when the number of units of water he used, w, increases by 1. The P–intercept means that if the number units of water Randy used was 0, the payment would be ?28. Bruce drives his car for his job. The equation models the relation between the amount in dollars, R, that he is reimbursed and the number of miles, m, he drives in one day. Find the amount Bruce is reimbursed on a day when he drives 0 miles. Find the amount Bruce is reimbursed on a day when he drives 220 miles. Interpret the slope and R-intercept of the equation. Graph the equation. Janelle is planning to rent a car while on vacation. The equation models the relation between the cost in dollars, C, per day and the number of miles, m, she drives in one day. Find the cost if Janelle drives the car 0 miles one day. Find the cost on a day when Janelle drives the car 400 miles. Interpret the slope and C–intercept of the equation. Graph the equation. ?15 ?143 The slope, 0.32, means that the cost, C, increases by ?0.32 when the number of miles driven, m, increases by 1. The C-intercept means that if Janelle drives 0 miles one day, the cost would be ?15. Cherie works in retail and her weekly salary includes commission for the amount she sells. The equation models the relation between her weekly salary, S, in dollars and the amount of her sales, c, in dollars. Find Cherie’s salary for a week when her sales were 0. Find Cherie’s salary for a week when her sales were 3600. Interpret the slope and S–intercept of the equation. Graph the equation. Patel’s weekly salary includes a base pay plus commission on his sales. The equation models the relation between his weekly salary, S, in dollars and the amount of his sales, c, in dollars. Find Patel’s salary for a week when his sales were 0. Find Patel’s salary for a week when his sales were 18,540. Interpret the slope and S-intercept of the equation. Graph the equation. ?750 ?2418.60 The slope, 0.09, means that Patel’s salary, S, increases by ?0.09 for every ?1 increase in his sales. The S-intercept means that when his sales are ?0, his salary is ?750. Costa is planning a lunch banquet. The equation models the relation between the cost in dollars, C, of the banquet and the number of guests, g. Find the cost if the number of guests is 40. Find the cost if the number of guests is 80. Interpret the slope and C-intercept of the equation. Graph the equation. Margie is planning a dinner banquet. The equation models the relation between the cost in dollars, C of the banquet and the number of guests, g. Find the cost if the number of guests is 50. Find the cost if the number of guests is 100. Interpret the slope and C–intercept of the equation. Graph the equation. ?2850 ?4950 The slope, 42, means that the cost, C, increases by ?42 for when the number of guests increases by 1. The C-intercept means that when the number of guests is 0, the cost would be ?750. Use Slopes to Identify Parallel Lines In the following exercises, use slopes and y-intercepts to determine if the lines are parallel. Use Slopes to Identify Perpendicular Lines In the following exercises, use slopes and y-intercepts to determine if the lines are perpendicular. Slope-intercept form is y=mx+b, where m represents the slope and b represents the y-intercept. To write a slope-intercept equation from a graph, find the point where the graph crosses the y-axis, b, and the slope, m, and plug them into the equation y=mx+b. There are a few different ways to write the equation of a line. One of the most common ways is called "slope-intercept" form. It's called this because it clearly identifies the slope and the y-intercept in the equation. The slope is the number written before the x. The y-intercept is the constant written at the end. Let's look at an example: y = 3x + 2. The coefficient of the x-term is 3, this means the line has a slope of 3. The constant being added at the end is 2. This means the y-intercept (where the line crosses the y-axis) is at positive 2. What do you do if there's a minus sign in between the two terms? For example, what about the equation y = 5x - 8? We can rewrite subtracting 8 as adding a negative 8. This means the y-intercept is at -8. If you know two points on a line, you can use them to write the equation of the line in slope-intercept form. The first step will be to use the points to find the slope of the line. This will give you the value of m that you can plug into y = mx + b. The second step will be to find the y-intercept. Once you know m and b, you can write the equation of the line. The slope of the line through two points (x1,y1) and (x2,y2) can be found by using the formula below. Make sure to check out our lesson on using points to find slope if you need extra help on this step. Don't forget slope is rise over run: subtract the y-values in the numerator to get the rise and subtract the x-values in the denominator (in the same order!) to get the run. Once you know the slope of the line, plug it in for m in y = mx + b. For example, if you used the formula and found that the slope is 2, you would write y = 2x + b. The example below shows the first steps you would take if you needed to write an equation of the line through the points (2,5) and (4,13). Welcome to Kate's Math Lessons! Teachers,make sure to check out the study guides and activities. Once you know the slope (m), you're halfway there. Now all that's left to find is the y-intercept (b). To find the y-intercept, choose one of the points on the line. It does not matter which point you choose (just pick the one that looks easiest to you). Plug in the values for x and y into the equation and solve for b. At this point, you've solved for both m and b. All that's left to do is to plug them both in and write the equation in slope-intercept form (y = mx + b). It's always a good idea to check your work when possible. To double check the accuracy of your equation, you can use the other point that's on the line (the one you didn't use in Step 2 to find b). Plug in the x value from this point into your y = mx + b equation and see if it comes out to the correct y value. Step 1: Find the slope (m).Use the formula to find the slope between the two points. Once you know the slope, plug it in for m in y = mx + b. This gives you y = 3x + b.Step 2: Find the y-intercept (b).Pick one of the points on the line and use the x and y values to find b. It does not matter which point you choose. We'll pick the first point (4,7) and plug in 4 for x and 7 for y. Step 3: Write the equation in slope-intercept form (y = mx + b)Now that we know m = 3 and b = -5, we can plug these values in and write the equation in slope-intercept form. Step 4: Check your answerWe used the point (4,7) in Step 2, so to check our equation we need to use the other point: (6,13). If you use the same point twice, it will not find a mistake. Make sure to use the point you didn't use to find the y-intercept in Step 2.Plug in the x value from the other point and see if it works. If we plug in 6 for x in our equation, the y value should come out to 13. 3(6) - 5 = 18 - 5 = 13. It works!If we had plugged in 6 and it came out to a number that wasn't 13, that would tell us that we had made a mistake somewhere along the way. If this happens to you, start by double checking to make sure you calculated the slope correctly. You may have used the formula incorrectly or missed a negative sign somewhere. Ready to try a few problems on your own? Click the START button below to try a practice quiz! An equation in the slope-intercept form is written as $$y=mx+b$$ Where m is the slope of the line and b is the y-intercept. You can use this equation to write an equation if you know the slope and the y-intercept. Example Find the equation of the line Choose two points that are on the line Calculate the slope between the two points $$m=\frac{y_{2}\, -y_{1}}{x_{2}\, -x_{1}}=\frac{\left (-1 \right)-3}{3-\left (-3 \right)}=\frac{-4}{6}=\frac{-2}{3}$$ We can find the b-value, the y-intercept, by looking at the graph b = 1 We've got a value for m and a value for b. This gives us the linear function $$y=-\frac{2}{3}x+1$$ In many cases the value of b is not as easily read. In those cases, or if you're uncertain whether the line actually crosses the y-axis in this particular point you can calculate b by solving the equation for b and then substituting x and y with one of your two points. We can use the example above to illustrate this. We've got the two points (-3, 3) and (3, -1). From these two points we calculated the slope $$m=-\frac{2}{3}$$ This gives us the equation $$y=-\frac{2}{3}x+b$$ From this we can solve the equation for b $$b=y+\frac{2}{3}x$$ And if we put in the values from our first point (-3, 3) we get $$b=3+\frac{2}{3}\cdot \left (-3 \right)=3+\left (-2 \right)=1$$ If we put in this value for b in the equation we get $$y=-\frac{2}{3}x+1$$ which is the same equation as we got when we read the y-intercept from the graph. To summarize how to write a linear equation using the slope-interception form you Identify the slope, m. This can be done by calculating the slope between two known points of the line using the slope formula. Find the y-intercept. This can be done by substituting the slope and the coordinates of a point (x, y) on the line in the slope-intercept formula and then solve for b. Once you've got both m and b you can just put them in the equation at their respective position. Video lesson Find the equation to the graph Point-Slope FormParallel, Perpendicular Lines Straight-line equations, or "linear" equations, graph as straight lines, and have simple variable expressions with no exponents on them. If you see an equation with only x and y – as opposed to, say x2 or sqrt(y) – then you're dealing with a straight-line equation. There are different types of "standard" formats for straight lines; the particular "standard" format your book refers to may differ from that used in some other books. (There is, ironically, no standard definition of "standard form".) The various "standard" forms are often holdovers from a few centuries ago, when mathematicians couldn't handle very complicated equations, so they tended to obsess about the simple cases. Nowadays, you likely needn't worry too much about the "standard" forms; this lesson will only cover the more-helpful forms. I think the most useful form of straight-line equations is the "slope-intercept" form: This is called the slope-intercept form because "m" is the slope and "b" gives the y-intercept. (For a review of how this equation is used for graphing, look at slope and graphing.) I like slope-intercept form the best. It is in the form "y=", which makes it easiest to plug into, either for graphing or doing word problems. Just plug in your x-value; the equation is already solved for y. Also, this is the only format you can plug into your (nowadays obligatory) graphing calculator; you have to have a "y=" format to use a graphing utility. But the best part about the slope-intercept form is that you can read off the slope and the intercept right from the equation. This is great for graphing, and can be quite useful for word problems. Common exercises will give you some pieces of information about a line, and you will have to come up with the equation of the line. How do you do that? You plug in whatever they give you, and solve for whatever you need, like this: Okay, they've given me the value of the slope; in this case, m = 4. Also, in giving me a point on the line, they have given me an x-value and a y-value for this line: x = –1 and y = –6. In the slope-intercept form of a straight line, I have y, m, x, and b. They've given me the value for m, along with values for an x and a y. So the only thing I don't have so far is a value for is b (which gives me the y-intercept). Then all I need to do is plug in what they gave me for the slope and the x and y from this particular point, and then solve for b: y = mx + b (–6) = (4)(–1) + b –6 = –4 + b –2 = b Then the line equation must be "y = 4x – 2". What if they don't give you the slope? Well, if I have two points on a straight line, I can always find the slope; that's what the slope formula is for. Now I have the slope and two points. I know I can find the equation (by solving first for "b") if I have a point and the slope; that's what I did in the previous example. Here, I have two points, which I used to find the slope. Now I need to pick one of the points (it doesn't matter which one), and use it to solve for b. Using the point (–2, 4), I get: y = mx + b 4 = (– 2/3)(–2) + b 4 = 4/3 + b 4 – 4/3 = b 12/3 – 4/3 = b b = 8/3 ...so y = (– 2/3) x + 8/3. On the other hand, if I use the point (1, 2), I get: So it doesn't matter which point I choose. Either way, the answer is the same: As you can see, once you have the slope, it doesn't matter which point you use in order to find the line equation. The answer will work out the same either way. URL:

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