Slope of a standard form linear equation

I'm not robot!

3/4 find the multiples of 4:	4, 8, 12, 16, 20 8 is the least common
1/8 find the multiples of 8:	8. 16. 24
<mark>8</mark> [y = 3/4x - 1/8]	Multiply ALL terms by 8.
8y = 6x - 1	
-6x + 8y = 6x - 6x - 1	Subtract 6x from both sides to get x and y on the same side.
-6x + 8y = -1	
-1[-6x + 8y = -1]	Multiply ALL terms by -1 to make the lead coefficient positive.
6x - 8y = 1	The equation written in standard form.

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Graph the equation: y = 2x +4
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y = 2x +4 Slope Y-intercept

Step 1: Plot the y-intercept on your graph. 4 is the y-intercept, so I am going to plot the point (0,4).



Step 2: Identify the slope. (The coefficient of x is the slope.) The slope is 2. From the y-intercept, you are going to count a rise of 2 and a run of 1. Plot your second point.



 $f(x) = (2x^{2} + 8x) + 7$ $f(x) = 2(x^{2} + 4x) + 7$ $d = (4/2)^{2} = 2^{2} = 4$





If you're seeing this message, it means we're having trouble loading external resources on our website. If you're behind a web filter, please make sure that the domains *.kastatic.org and *.kastatic.org such an equation is Ax + By + C = 0 or Ax + By = C. When you rearrange this equation to get y by itself on the left side, it takes the form y = mx + b. This is called slope intercept form because m is equal to the slope of the line, and b is the value of y when x = 0, which makes it the y-intercept. Converting from slope intercept form to standard form takes little more than basic arithmetic. To convert from slope intercept form Ax + By + C = 0, let m = A/B, collect all terms on the left side of the equation in slope intercept form has the basic structure y = mx + b begin{aligned} y - mx &= (mx - mx) + (mx - mx) + b \\ y - mx &= b \end{aligned} y - mx - b &= 0 - Ax + By - C = 0 (1) - The equation of a line in slope intercept form is: $y = \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation of a line in slope intercept form is: $y = \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2} x + 5$ What is the equation in standard form? $y - \frac{1}{2$ $5 y - \frac{1}{2}x - 5 = 0 2y - x - 10 = 0 - x + 2y - 10 = 0$ You can leave the equation like this, but if you prefer to make x positive, multiply both sides by -1: x - 2y + 10 = 0 x - 2y = -10(2) - The slope of a line is -3/7 and the y-intercept is 10. What is the equation of the line in standard form? The slope of a line is -3/7 and the y-intercept is 10. What is the equation of the line in standard form? The slope of a line is -3/7 and the y-intercept is 10. What is the equation of the line in standard form? The slope of a line is -3/7 and the y-intercept is 10. What is the equation of the line in standard form? The slope of a line is -3/7 and the y-intercept is 10. What is the equation of the line in standard form? The slope of a line is -3/7 and the y-intercept is 10. What is the equation of the line in standard form? The slope of a line is -3/7 and the y-intercept is 10. What is the equation of the line in standard form? The slope of a line is -3/7 and the y-intercept is 10. What is the equation of the line in standard form? The slope of a line is -3/7 and the y-intercept is 10. What is the equation of the line in standard form? The slope of a line is -3/7 and the y-intercept is 10. What is the equation of the line in standard form? The slope of a line is -3/7 and the y-intercept is 10. What is the equation of the line in standard form? The slope of a line is -3/7 and the y-intercept is 10. What is the equation of the line in standard form? The slope of a line is -3/7 and the y-intercept is 10. What is the equation of the line in standard form? The slope of a line is -3/7 and the y-intercept is 10. What is the equation of the line in standard form? The slope of a line is -3/7 and the y-intercept is -3/7 and t Following the procedure outlined above: \begin{aligned} y + \frac{3}{7}x - 10 = 0 \\ 7y + 3x - 70 = 0 \\ intercept form for linear equations, y = m x + b. Point-Slope form for linear equations, y - y1 = m (x - x1). Equations of parallel lines have either one being horizontal and the other vertical, or slopes that multiply to give -1 This page will build upon all of this through an examination of the standard form for linear equations: Ax + By = C The Standard Form for a linear equation in two variables, x and y, is usually given as Ax + By = C where, if at all possible, A, B, and C are integers, and A is non-negative, and A, B, and C have no common factors other than 1. If we have a linear equation in slope-intercept form, y = mx + b we can change that equation into Standard Form. To do this we need to express the slope and the ordinate of the the y-intercept in rational number form, that is, as the quotient of two integers. For the kinds of problems that we usually find in math classes, this is not much of a demand. The slope is defined to be the change in y divided by the change in x. Thus, if we express the slope as ychange/xchange, we will have met our first demand. The ordinate of the y-intercept usually follows the same scheme, so we can express that value, the "b" in y=mx+b, as the quotient of two integers, which we will call b num and b den. This means that our slope-intercept form y = mx + b can be rewritten as y = mx + b. (ychange/xchange) x + b num/b den If we multiply both sides of the equation by the least common multiple of xchange" and "b den", the resulting equation will have no fractions. It will appear as <math>Dy = Ex + F where D, E, and F are integers. Then, we add - Ex to both sides of the equations to get - Ex + Dy = F To get this into standard form we want the coefficient of x to be non-negative. If - E is actually negative, then we can multiply both sides of the equation be - 1. In either case, we end up with an equation that has the standard form, Ax + By = C where, if at all possible, A, B, and C are integers, and A is non-negative, and, A, B, and C have no common factors other than 1. Let us look at a few examples. The first example will be the most complex. We start with y = (5/6)x + 7/4 Our first step is to multiply both sides by the least common multiple of 6 and 4, namely 12. 12y = 12((5/6)x + 7/4) 12y = 10x + 21 Now we have removed all fractions, we bring the x term to the left side. -10x + 12y = 21 And, because the coefficient of x is negative, we multiply both sides by -1. (-1)(-10x + 12y) = (-1)(21) This produces the desired result, the standard form 10x + -12y = -21 Another example would be to start with y = (1/3)x + 5/6 The least common multiple of 3 and 6 is 6, so we multiply both sides by -1. (-1)(-10x + 12y) = (-1)(21) This produces the desired result, the standard form 10x + -12y = -21 Another example would be to start with y = (1/3)x + 5/6 The least common multiple of 3 and 6 is 6, so we multiply both sides by -1. + (6)(5/6) 6y = 2x + 5 We add - 2x to both sides to give - 2x + 6y = -5 And we make the leading coefficient of x be positive by multiplying both sides by - 1. (-1)(-2x + 6y) = -5 2x + -6y = -5 which is in standard form. A third example is the slope-intercept form y = -2x + 8 Here, we have no need to clear fractions. We can move the x term to the left side by adding 2x to both sides. 2x + y = 8 And this is already in standard form. We have seen that we can transform slope-intercept form equations for vertical lines, which is not possible in slope-intercept form. Remember that vertical lines have an undefined slope (which is why we can not write them in slope-intercept form). However, the vertical lines have an undefined slope (which is why we can not write them in slope-intercept form). horizontal line through the point (4,7) has the slope-intercept form y=0x+7, and the standard form 0x+1y=7. This example demonstrates why we ask for the leading coefficient of x must be zero.] A second reason for putting equations into standard form is that it allows us to employ a technique for solving systems of linear equations. This topic will not be covered until later in the course so we do not need standard form is that it simplifies finding parallel and perpendicular lines. Let us look at the typical parallel line problem. Find the equation of the line 3x+4y=17 and that contains the point (2,8). The usual approach to this problem is to find the slope of the given point in the point-slope form for a linear equation, Ax + By = C and we move the Ax term to the other side By = -Ax + C and we divide both sides by B, assuming B is not zero, we get y = (-A/B)x + C/B which is the slope intercept form. From that form we see that the slope is -A/B. Any line parallel to the given line must have that same slope. Of course, the only values affecting the slope are A and B from the original standard form. Therefore, as long as A and B do not change, any line that has a standard form of Ax + By = H will be parallel to the line 3x+4y=17 and that contains the point (2,8)" we can see that the answer must look like 3x + 4y = H and we just need to find the value of H. Of course, we also know that the point (2,8) must make the equation true, so 3(2) + 48 = H must be true. But this means that we have 6 + 32 = H or 38 = H Because we know the value of H. We have the complete answer 3x + 4y = 38 Any time we are given a standard form linear equations and we are asked to find the equation of a parallel line through a given point, we know that the answer will look just like the original equation, but it will have a different constant value. We can find that value by making the equation, but it will have a different constant value. 2x + 5v = -19 and that contains the point (4, -7)" The answer must look line 2x + -5v = H and (4, -7) must make it true. Therefore, 2(4) + -5(-7) = H + 35 = H + 35perpendicular lines? Let us look at two lines, in standard form Ax + By = C Bx + - Ay = D The slope of the first is - A/B and the slope of the first is - A/B and the slope of the second is B/A. If we multiply these together we get (- AB)/(AB) or - 1. These lines must be perpendicular. If we take our usual "perpendicular line problem", "Find the equation of the line that is perpendicular to the line 3x+4y=17 and that contains the point (2,8)" we know that the answer will have to look like 4x + -3y = D where we have changed the sign of one of them. Furthermore, we know that the point (2,8) will have to make this new equation true, so 4(2) + -3(8) = D + 24 = D - 16= D Therefore, the answer is the standard form linear equation of the line 5x + 2y = 19 and that contains the point (4, - 7)." The answer must look line 5x + 2y = 19 and that contains the point (4, - 7)." The answer must look line 5x + 2y = 19 and that contains the point (4, - 7)." true. Therefore, 5(4) + 2(-7) = D 20 + -14 = D 6 = D and that gives us the solution 5x + 2y = 6 From the presentation above we can see that we can do the "usual" parallel and perpendicular line problems in just a few steps without ever finding the slope of the original line and without using the point-slope form of a linear equation. For completeness we should check our methods with horizontal lines. The standard form for a horizontal line is 0x+1y=C. Another horizontal line is 0x+1y=C. Another horizontal line, one parallel to the first, will still work. We just leave the "A" and "B" values the same and find a new value for "D" by substituting the coordinates of the external point. The standard form for a vertical line, one parallel to the first, will still work. We just leave the "A" and "B" values the same and find a new value for "D" by substituting the coordinates of the external point. If we start with a horizontal line in the form 0x+1y=C, and we reverse the sign of one of them, we get 1x+0y=D, which is the general form of a vertical line. This corresponds to our method for finding perpendicular lines. PRECALCULUS: College Algebra and Trigonometry © 2000 Dennis Bila, James Egan, Roger Palay

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