**Standard Form of a Linear Equation**

$$Ax+By=C$$

* The slope-intercept form of a line is $y=mx+b$.
* The standard form of a line is *Ax + By = C*.
* The parameters *A, B* and *C* are may be any real numbers. Often they are integers.
* You have used the standard form of an equation with you investigated iPods and points scored at basketball games.
* You can transform an equation in standard form into slope-intercept form by solving for *y.*
* You can transform an equation in slope-intercept form into standard form by getting the constant term alone on the right side of the equal sign. Multiply the equation by a common denominator if necessary to clear fractions.
* If you multiply or divide both sides of an equation in standard form by the same number, you’ll get an equivalent equation that is also in standard form.

Here is an example of a linear function that lends itself well to *slope-intercept form*:

It costs $200 to open the St Vincent DePaul Soup for the evening meal regardless of the number of people served. The average meal cost per person is $4. What is the total cost of feeding people? Let *x* be the number of people who eat, and let y be the total cost.

An equation to model this situation is $y=4x+200$.

Here is an example of linear function that lends itself well to *standard form*:

Each year, Norwich students make hundreds of clay soup bowls for a soup kitchen fundraiser known as the “Empty Bowls Project”. Then the public is invited to buy a meal of soup, bread and cookies and receive a beautiful handmade bowl. Musicians volunteer to play for the dinner. For $12 the customers choose a bowl to keep and get the simple meal. For $8, you get a simple meal, but no handmade bowl. Last year, $960 was raised for charity. What are the possible combinations of meal-alone tickets and bowl-meal tickets that were sold at Empty Bowls? Let *x* represent the number of bowl-meal tickets sold. Let *y* represent the number of meal-alone tickets sold.

An equation that models the situation is $12x+8y=960$.

1. Answer the following questions based on the equation $12x+8y=960$.
2. What does the 12*x* mean?
3. What does the 8*y* mean?
4. The standard form of a linear equation is *Ax +By = C.*  In $12x+8y=960$, what number is:

*A \_\_\_\_\_\_ B* \_\_\_\_\_\_\_ *C* \_\_\_\_\_\_\_

1. Fill in the table that gives possible combinations for the numbers of bowl-meal tickets and the number of meal-alone tickets that might have been sold to raise $960.

|  |  |
| --- | --- |
| ***x*: # of Bowl-Meals tickets at $12 each** | ***y*: # of Meal Alone tickets at $8 each** |
| 0 |  |
| 2 |  |
| 4 |  |
| 6 |  |
|  |  |
|  |  |
|  | 6 |
|  | 3 |
|  | 0 |

1. Write ordered pairs and graph the points on a coordinate plane.



1. What is the *x*-intercept? What does it mean in the context of the problem?
2. What is the *y-*intercept? What does it mean in the context of the problem?
3. What is the slope of the equation and what does it mean in the context of the problem?
4. Transform the equation 12*x* + 8*y* = 960 into slope-intercept form ($y=mx+b$). Check to see that your answer in part (g) and (h) is the same slope and *y-*intercept in part (i).
5. Graph the linear functions in standard form by finding the *x* and *y* intercepts. Then find the slope and write the equation in slope-intercept form.

1. Given 3*x* + 2*y* = 12, find both intercepts and the slope. Then draw the graph.



|  |  |
| --- | --- |
| *x* | *y* |
| 0 |  |
|  | 0 |

*x-*intercept:

*y-*intercept:

Slope:

1. Write 3*x* + 2*y* = 12 in slope-intercept form: *y = mx + b.*
2. From the slope-intercept form of the equation, the slope is \_\_\_\_\_ and the *y-*intercept is \_\_\_\_\_\_\_. Check to see that the results agree with your answers in part (a).
3. Given 4*x* – 5*y* = 20, find both intercepts and the slope. Then draw the graph.



|  |  |
| --- | --- |
| *x* | *y* |
| 0 |  |
|  | 0 |

*x-*intercept:

*y-*intercept:

Slope:

1. Write 4*x* – 5*y* = 20 in slope-intercept form: *y = mx + b.*
2. From the slope-intercept form of the equation, the slope is \_\_\_\_\_ and the *y-*intercept is \_\_\_\_\_\_\_. Check to see that the results agree with your answers in part (d).
3. Given 6*x* – 5*y* = 30, find both intercepts and the slope. Then draw the graph.



|  |  |
| --- | --- |
| *x* | *y* |
| 0 |  |
|  | 0 |

*x-*intercept:

*y-*intercept:

Slope:

1. Write 6*x* – 5*y* = 30 in slope-intercept form: *y = mx + b.*
2. What is one advantage of the standard form (compared to slope-intercept form)?
3. What is one advantage of slope-intercept form?
4. For its community service this year, the GHS Honors Society has “adopted” the patients in the neighborhood Convalescent Home. The students visit the patients one afternoon a month to play cards, chat, read aloud and write letters for patients. When Jewett City Florist learned about the Honor Society’s good deeds, they donated 360 stems of flowers and greens to the Honors Society to bring cheer to the patients in the convalescent home. The students will make either a corsage for the women or a boutonniere for the men. Corsages will require 5 stems, and the boutonniere will require 3 stems. If the students use all 360 stems, what are the possible number of corsages and boutonnieres they can make?
5. Choose a variable to represent the number of corsages the students can make.
6. Choose a variable to represent the number of boutonnieres the students can make.
7. Fill in 5 rows of a table that shows a specific number of boutonnieres depending on the number of corsages made.

|  |  |
| --- | --- |
| **# of 5 stem****corsages made** | **# of 3 stem****boutonnieres** |
| 0 |  |
| 30 |  |
|  |  |
|  |  |
|  |  |
|  | 0 |

1. Write a linear equation in standard form that models this situation.
2. Write the equation from part (d) in slope-intercept form.