

2.2: Graphing
Linear
Equations in
Two Variables

MATH 30 -
Spring 2017

Determine
whether
ordered pair is
a solution

Solving an
equation in
two variables

Graph linear
equations

By plotting
points

By finding
intercepts

Graph
horizontal and
vertical lines

Use linear
models to
solve applied
problems

2.2: Graphing Linear Equations in Two Variables

Graphs, Equations of Lines, and Functions

MATH 30 - Spring 2017

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Success Tip #2

2.2: Graphing Linear Equations in Two Variables

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- Review your notes as early after class as you can!
 - Most forgetting takes place within the first 24 hours of encountering new information
 - By reviewing your notes right away, you will retain much more of the information
 - Never wait longer than one day to review the lecture notes
- If there is a part of your notes that you don't understand, write out exactly where it is that you can no longer follow what was being done in lecture and then come see me during my next office hour!

Objectives

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Ordered Pair Solution

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Solution

A solution of an equation in two variables is an ordered pair of numbers that make a true statement when substituted into the equation.

If an ordered pair is a solution of the equation then the ordered pair is on the line.



Ordered Pair Solution

Example

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Is $(-4, 5)$ a solution of $y = -\frac{1}{2}x + 3$?

- Substitute for each variable
- Check if resulting equation is true



Ordered Pair Solution Practice

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Is $(4, -1)$ a solution of $y = -\frac{1}{2}x + 3$?

Solving a Linear Equation

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- Select a value for one of the variables
- Solve for the corresponding value of the other variable

$(4, 1)$ is a solution of $y = -\frac{1}{2}x + 3$.



Solving a Linear Equation

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- Infinitely many solutions - impossible to list all
- Draw mathematical picture of the solutions - graph of the equation

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Graph By Plotting Points

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Point-Plotting Method

- 1 Find three ordered pairs that are solutions of the equation
- 2 Plot the solutions
- 3 Draw a straight line passing through the points

Graph: $y = -\frac{1}{2}x + 3.$



Standard Form

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Standard Form of a Linear Equation

A linear equation in two variables is an equation that can be written in the form

$$Ax + By = C$$

where A , B , and C are real numbers and A, B are not both 0.



Graph By Plotting Points

Practice

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Graph: $2x - 5y = 10$.

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Graphing by Finding Intercepts

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y-intercept

The y -intercept of a line is the point $(0, b)$, where the line intersects the y -axis. To find b , substitute 0 for x in the equation of the line and solve for y .

x-intercept

The x -intercept of a line is the point $(a, 0)$, where the line intersects the x -axis. To find a , substitute 0 for y in the equation of the line and solve for x .



Graphing by Finding Intercepts

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Graphing by Finding Intercepts

Practice

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Graph: $5x + 15y = -15$.



Horizontal and Vertical Lines

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- Equations such as $y = 3$ and $x = -2$ are linear equations.
- They can be written in the standard form $Ax + By = C$.
- We can graph these types of equations using point-plotting.



Horizontal and Vertical Lines

Practice

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Graph the following equations:

■ $x = 4$

■ $y = -3$



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Equations of Horizontal Lines

The graph of $y = b$ is a horizontal line with y -intercept $(0, b)$.

Equations of Vertical Lines

The graph of $x = a$ is a vertical line with x -intercept $(a, 0)$.

Note that the graph of $y = 0$ is the x -axis
and the graph of $x = 0$ is the y -axis.



Linear Models

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- Often written in variables other than x and y
- Used to make observations about what has occurred in the past and what might occur in the future
- Commonly used as a "best-fit line"



Linear Models

Example

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Use linear models to solve applied problems

- 82. Hourly Pay.** The equation $p = 0.4t + 10.5$ approximates the average hourly pay p (in dollars) of a U.S. manufacturing worker, t years after 1990. (Source: U.S. Bureau of Labor Statistics)
- Graph the equation.
 - What information can be obtained from the p -intercept of the graph?
 - Suppose the current trend continues. From the graph, estimate the average hourly pay for manufacturing workers in 2014.