Lesson 4.1 Ordered Pairs and Graphs

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https://app.peardeck.com/student/tlxzsuira

MCA
Lesson 4.1

Graphs and Functions

4.1 Ordered Pairs and Graphs

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What You Will Learn

- Plot points on a rectangular coordinate system.
- Determine whether ordered pairs are solutions of equations.
- Use the verbal problem-solving method to plot points on a rectangular coordinate system.

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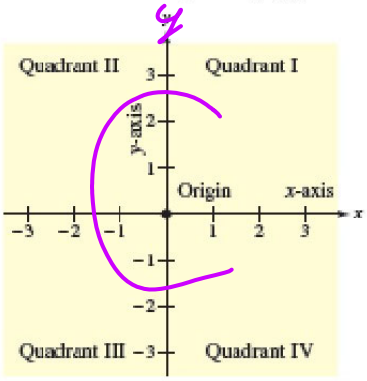
The Rectangular Coordinate System 1

The coordinate system is formed a horizontal number line is the ***x*-axis** and the vertical number line is the ***y*-axis.** The point of intersection of the two axes is called the **origin (0,0)**, and the axes separate the plane into four regions called **quadrants**. Each point in the plane corresponds to an **ordered pair** (*x*,y) called the **coordinates** of the point.



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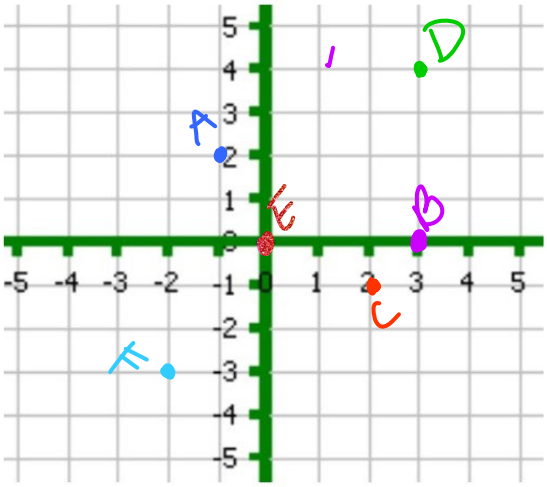
Example 1 – Plotting Points on a Rectangular Coordinate System

Plot the points (−1, 2), (3, 0), (2, −1), (3, 4), (0, 0), and (−2, −3) on a rectangular coordinate system.

Solution:



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The Rectangular Coordinate System 2

Many real-life situations involve finding relationships

Many real-life situations involve finding relationships between two variables, such as the year and the median weekly earnings of workers in the labor force.

In a typical situation, data are collected and written as a set of ordered pairs. The graph of such a set is called a **scatter plot.**

Example 2 – Sketching a Scatter Plot

The scores of the Super Bowl games from 2002 through 2017 are shown in the table. Plot these points on a rectangular coordinate system. (*Source:* National Football League)

DATA

Spreadsheet at CollegePrepAlgebra.com

Year	Winning Score	Losing Score
2002	20	17
2003	48	21
2004	32	29
2005	24	21
2006	21	10
2007	29	17
2008	17	14
2009	27	23
2010	31	17
2011	31	25
2012	21	17
2013	34	31
2014	43	8
2015	28	24
2016	24	10
2017	34	28

Example 2 – Sketching a Scatter Plot cont'd

Solution:

To sketch a scatter plot of the data, let the x-coordinates of the points represent the year, and the y-coordinates represent the winning and losing scores. The winning scores are shown as black dots, and the losing scores are shown as blue dots. Note in the scatter plot that the break in the x-axis indicates that the numbers between 0 and 2002 have been omitted.

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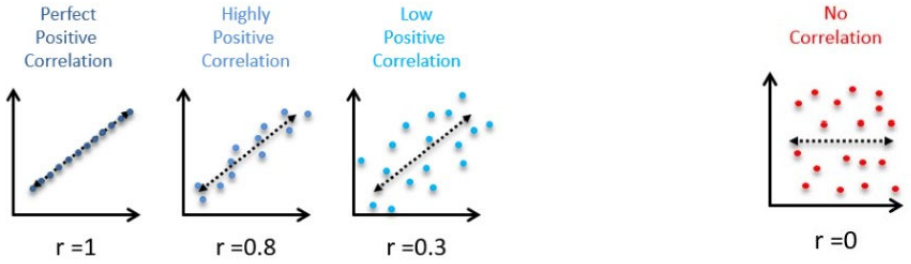
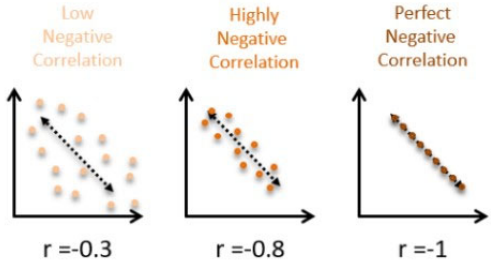
Scatter Plots & Correlation Examples





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Example 3 – Constructing a Table of Values 1

$6(2)-2y=4$ $6(1)-2y=4$

Construct a table of values showing five solution points for the equation $6x - 2y = 4$.

$6(0)-2y=4$ $6(-2)-2y=4$ $6(-1)-2y=4$

Then plot the solution points on a rectangular coordinate system. Choose x-values of −2, −1, 0, 1, and 2.

x	y
-2	-8
-1	-5
0	-2
1	1
2	4

Solution: *First you must get the equation into slope – intercept form from standard form (y=mx+b)

$-6x-2y=4$

$-6x \quad -6x$

$-2y=-6x+4$

$-2y = -6x + 4$

$\frac{-2y}{-2} = \frac{-6x}{-2} + \frac{4}{-2}$

$y = 3x - 2$

$3(0) - 2$

$3(1) - 2$

$3(2) - 2$

$3(-1) - 2$

Example 3 – Constructing a Table of Values 2

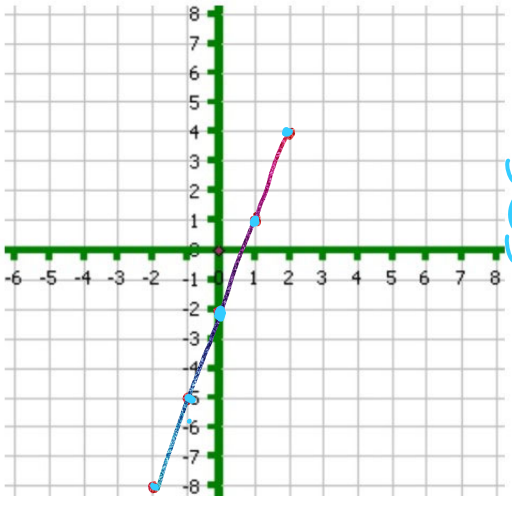
Now, using the equation $y =$

you can construct a table of values.

x	−2	−1	0	1	2
$y =$	−8	−5	−2	1	4
Solution point	(−2, −8)	(−1, −5)	(0, −2)	(1, 1)	(2, 4)

Example 3 – Constructing a Table of Values 3

From the table, you can plot the solution points on a rectangular coordinate system. You can also graph using slope-intercept form.



$y = 3x - 2$

$y = mx + b$

Slope

y-int

$\frac{3 \text{ rise}}{1 \text{ run}}$

Example 4 – Verifying Solutions of an Equation

Determine whether each ordered pair is a solution of $x + 3y = 6$.

a. (1, 2) **b.** (0, 2)

Solution: *Rewrite the equation into slope-intercept form and graph (check if both solutions are on the graph) – graph on the next slide.

***Also substitute the ordered pairs into the equation to check if they work!**