

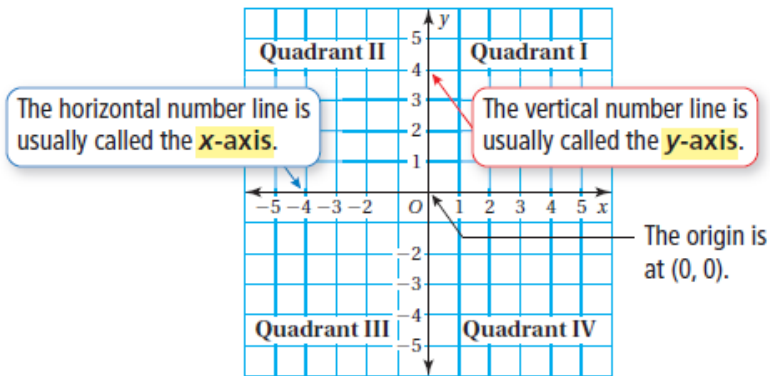
Indicator 12 Class Notes by Mrs. Joshi

The Coordinate Plane

Key Idea

The Coordinate Plane

A **coordinate plane** is formed by the intersection of a horizontal number line and a vertical number line. The number lines intersect at the **origin** and separate the coordinate plane into four regions called **quadrants**.



An **ordered pair** is a pair of numbers that is used to locate a point in a coordinate plane.

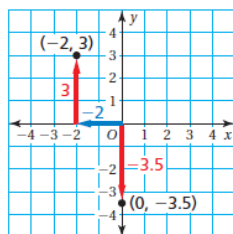
ordered pair

The **x-coordinate** corresponds to a number on the x-axis.

(4, -2)

The **y-coordinate** corresponds to a number on the y-axis.

EXAMPLE 1 Plotting Ordered Pairs



Plot (a) $(-2, 3)$ and (b) $(0, -3.5)$ in a coordinate plane. Describe the location of each point.

a. Start at the origin. Move 2 units **left** and 3 units **up**. Then plot the point.

∴ The point is in Quadrant II.

b. Start at the origin. Move 3.5 units **down**. Then plot the point.

∴ The point is on the y-axis.

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EXAMPLE 2 Real-Life Application

Reading

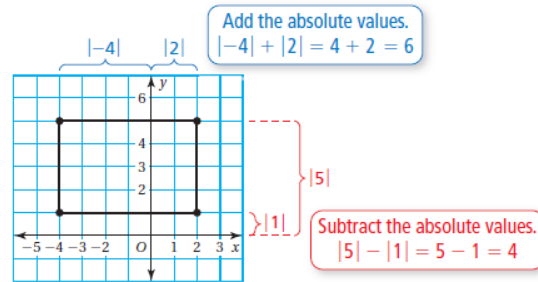
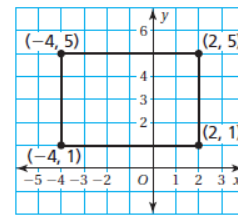
An archaeologist studies ancient ruins and objects to learn about people and cultures.

An archaeologist divides an area using a coordinate plane in which each unit represents 1 meter. The corners of a secret chamber are found at $(-4, 5)$, $(2, 5)$, $(2, 1)$, and $(-4, 1)$. What are the dimensions of the secret chamber?

Draw the secret chamber in a coordinate plane.

The length of the chamber is the distance between $(-4, 5)$ and $(2, 5)$. The width of the chamber is the distance between $(2, 5)$ and $(2, 1)$.

Use absolute values to find the distances between the points.



❖ The secret chamber is 6 meters long and 4 meters wide.

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Appendix B.6 — The Coordinate Plane

EXAMPLE 1 Writing Ordered Pairs

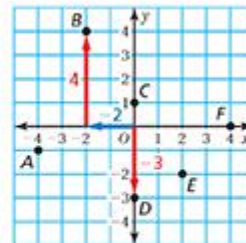
Write the ordered pair that corresponds to (a) point *B* and (b) point *D*.

- a. Point *B* is 2 units to the left of the origin. So, the *x*-coordinate is -2 . Point *B* is 4 units up. So, the *y*-coordinate is 4.

❖ The ordered pair $(-2, 4)$ corresponds to point *B*.

- b. Point *D* lies on the *y*-axis. So, the *x*-coordinate is 0. Point *D* is 3 units down from the origin. So, the *y*-coordinate is -3 .

❖ The ordered pair $(0, -3)$ corresponds to point *D*.



EXAMPLE 2 Plotting Ordered Pairs

Plot the point in a coordinate plane. Then describe its location.

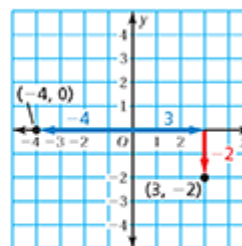
- a. $(3, -2)$ b. $(-4, 0)$

- a. Start at the origin. Move 3 units right and 2 units down. Then plot the point.

❖ The point is in Quadrant IV.

- b. Start at the origin. Move 4 units left. Then plot the point.

❖ The point is on the *x*-axis.



EXAMPLE 3 Real-Life Application

Reading

An archaeologist studies ancient ruins and objects to learn about people and cultures.

To keep track of where objects are found, an archaeologist divides an area using a coordinate plane.

- a. Which objects were found at $(-2, -4)$?

Start at the origin. Move 2 units left and 4 units down.

❖ Statues were found at $(-2, -4)$.

- b. In which quadrants were coins found?

❖ Coins were found in Quadrants II and IV.



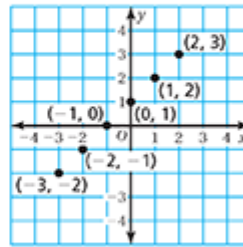
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Appendix B.7 – Graphing in the Coordinate Plane

EXAMPLE 1 Using an Input-Output Table

Plot the data in the input-output table. Describe the pattern.

Input, x	Output, y
-3	-2
-2	-1
-1	0
0	1
1	2
2	3

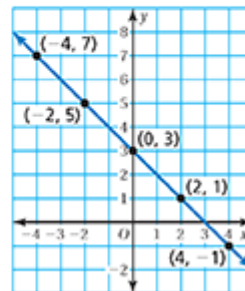


❖ The points lie on a line.

EXAMPLE 2 Graphing a Function

Make an input-output table for $y = 3 - x$. Use the inputs $-4, -2, 0, 2,$ and 4 . Then draw the graph of the function.

x	$3 - x$	y	(x, y)
-4	$3 - (-4)$	7	$(-4, 7)$
-2	$3 - (-2)$	5	$(-2, 5)$
0	$3 - 0$	3	$(0, 3)$
2	$3 - 2$	1	$(2, 1)$
4	$3 - 4$	-1	$(4, -1)$



EXAMPLE 3 Standardized Test Practice

Which function is shown in the table?

- (A) $y = 3 - x$ (B) $y = -x - 3$
 (C) $y = x + 3$ (D) $y = x - 3$

Look at the relationship between the inputs and outputs. Each output y is 3 less than the input x . So, the function is $y = x - 3$.

❖ The correct answer is (D).

Input, x	Output, y
-4	-7
-3	-6
-2	-5
-1	-4
0	-3

Remember

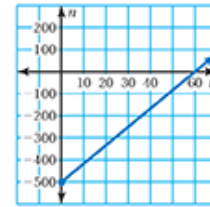
You can check your equation by substituting the input values for x in the equation.

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EXAMPLE 4 Real-Life Application



An underwater volcano erupts and forms an island. The graph shows the elevation n (in feet) of the volcano in relation to the ocean surface. Let t represent the number of years since its first eruption. What was the elevation of the volcano when it first erupted? Explain.



From the graph, the elevation is -500 feet when $t = 0$.

❖ So, the volcano first erupted 500 feet beneath the ocean surface.