

Read About Using All 4 Quadrants of the Coordinate Plane

THE COORDINATE PLANE HAS 4 QUADRANTS.

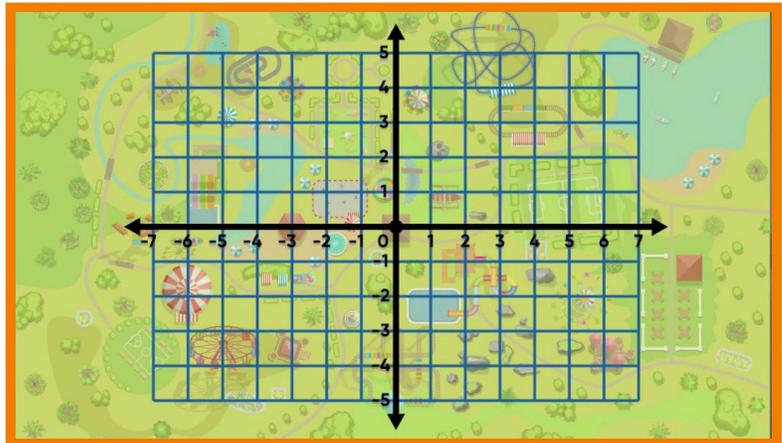
A number line goes on infinitely in both directions; so do the axes on a coordinate grid. Up until now, you only plotted points in the section of the coordinate plane where both x - and y -values were positive. You can also plot points where either value (or both!) is negative.

To better understand using all 4 quadrants of the coordinate plane...

LET'S BREAK IT DOWN!

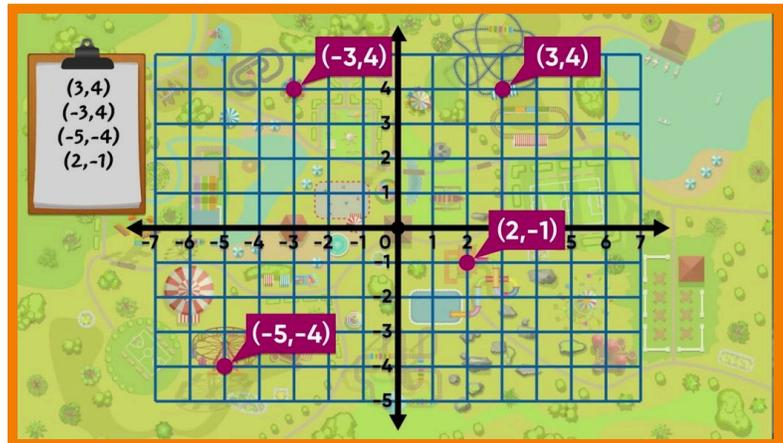
Expanding the coordinate grid.

An amusement park uses a coordinate grid to map out locations for rides. The coordinate grid shows new numbers now: the y -axis extends past 0 to the negative numbers, and so does the x -axis. There are now four sections, or quadrants, on the grid. Try this yourself: Identify the quadrant on the coordinate grid where you have plotted points before.



Plot points in all four quadrants in the coordinate grid.

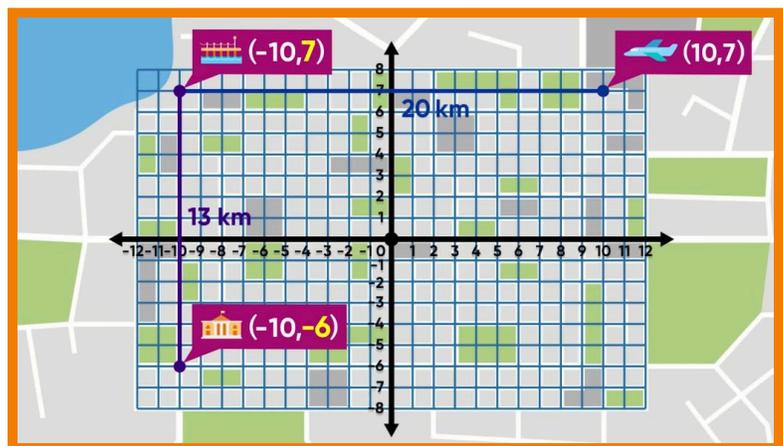
The locations of four rides at the park are: Radical Rollercoaster (3, 4), Elevator Doom Drop (-3, 4), Tilt-A-Whirl (-5, -4), and Raging Rapids Raft Adventure (2, -1). To locate the Radical Rollercoaster, start at the origin and go right 3 units on the x-axis to 3. Then move up 4 to the point (3, 4). To locate the Doom Drop



Tower, move 3 units to the left of 0 on the x-axis to -3. Next, move up 4 units from 0 on the y-axis to 4. To locate the Tilt-A-Whirl, move left from 0 on the x-axis 5 units and down 4 units below 0 on the y-axis to the point (-5, -4). To locate Raging Rapids, at point (2, -1), move 2 units to the right of 0 on the x-axis and 1 unit below 0 on the y-axis. Try this yourself: Describe how you would plot the Gift Shop at (-2, -2).

Draw and measure lines on the coordinate grid.

You need to find the distance between two locations on a city map. The pier is at (-10, 7) and the airport is at (10, 7). Both landmarks have the same y-coordinate, so they lie on a horizontal line. The distance is the number of units from one x-coordinate to the other. From -10 to 10 is 20 units. If each unit is 1



kilometer, the distance between these locations is 20 kilometers. You can also subtract the x-coordinates to find the distance: $10 - (-10) = 20$. To find the distance from the pier at point (-10, 7) and City Hall at point (-10, -6), subtract the y-coordinates: $7 - (-6) = 13$. The Pier and City Hall are 13 kilometers apart. Try this yourself: What is the distance between the Art Museum at (4, -6) and the Hotel at (4, -2)?

Find the perimeter of a shape using coordinates.

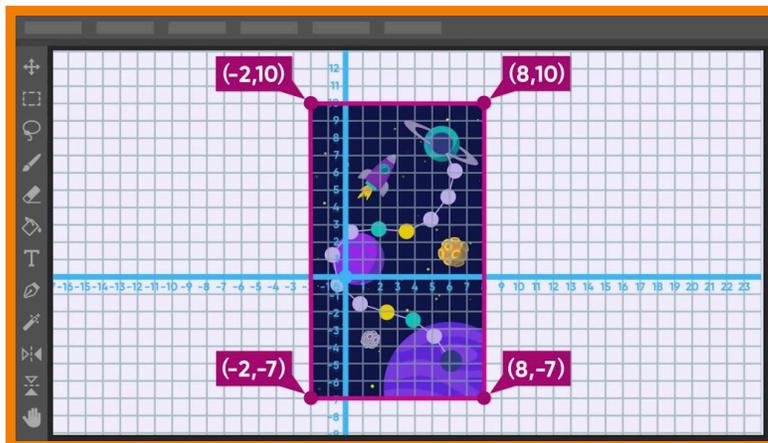
You've designed a board game on a coordinate grid on the computer.

The gameboard is a rectangle with vertices at $(8, 10)$, $(8, -7)$, $(-2, -7)$, and $(-2, 10)$. You need to calculate the area and perimeter of the gameboard. First, find the side lengths of the rectangle. Find the vertical distance between $(8, 10)$ and

$(8, -7)$: $10 - (-7) = 17$. One side length is 17 units. Next, find the horizontal distance between the points

$(8, -7)$ and $(-2, -7)$: $8 - (-2) = 10$. The other side length is 10 units. On a rectangle, opposite sides

have equal length. The perimeter is the sum $17 + 10 + 17 + 10 = 54$ units. If 1 unit is equal to 1 centimeter, the board game has perimeter 54 centimeters. The area of the rectangle is length times width, or $17 \times 10 = 170$ square centimeters. Try this yourself: What is the perimeter of a rectangle with vertices at $(2, 2)$, $(-2, 2)$, $(-2, -2)$ and $(2, -2)$?



USE ALL 4 QUADRANTS OF THE COORDINATE PLANE VOCABULARY

Coordinate plane

A grid that contains two number lines that intersect at a right angle at 0 and divide the plane into four quadrants.

Origin

The point where the two axes of a coordinate grid intersect; the point is represented by the ordered pair $(0, 0)$.

Ordered pair

The location of a point on a coordinate plane written as (x, y) .

x-axis

The horizontal number line on a coordinate grid.

y-axis

The vertical number line on a coordinate grid.

x-coordinate

The first number in an ordered pair, which names the distance to the right or left from the origin along the x-axis.

USE ALL 4 QUADRANTS OF THE COORDINATE PLANE DISCUSSION QUESTIONS

Describe how to locate the point $(-9, 7)$ on the coordinate grid.

Begin at the origin, move left 9 units on the x-axis, and then move up 7 units on the y-axis.

What are two different ways to find the length of a line segment between points

$(-3, 5)$ and $(6, 5)$?

Graph the two points on a coordinate plane and count the number of units between the x-coordinates (add the absolute values), or subtract the smaller x-coordinate from the larger x-coordinate ($6 - (-3) = 9$).

What point is located 7 units to the left and 4 units up from the point $(6, -3)$?

$(-1, 1)$

What type of line has endpoints at $(-3, 5)$ and $(-3, -4)$?

A vertical line

What is the area of a rectangle with vertices at $(0, 0)$, $(7, 0)$, $(0, -4)$, and $(7, -4)$?

28 square units
