

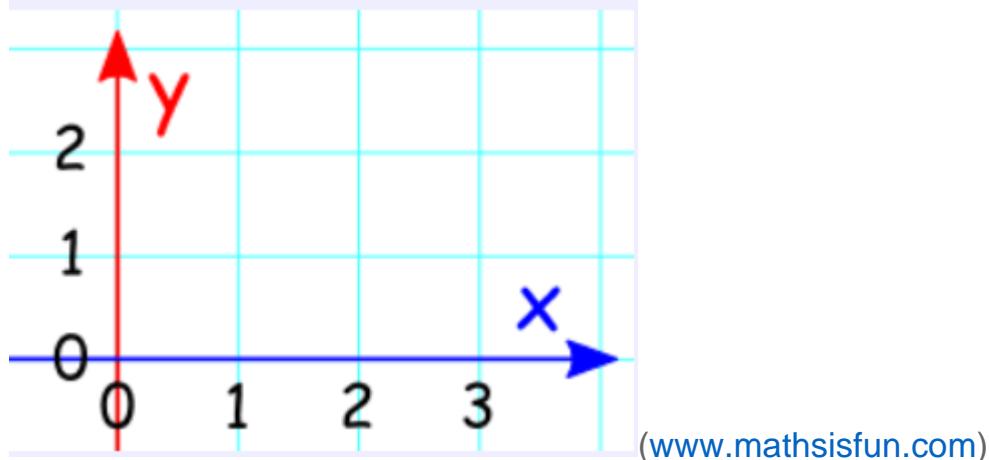
Module 6 Grade 5

In this unit your student will focus on Problem Solving with Coordinate Planes:

- ✓ Students use the familiar number line as an introduction to the idea of a coordinate and construct two perpendicular number lines to create a coordinate system on the plane.
- ✓ Students use the coordinate system to explore relationships between points, ordered pairs, patterns, lines and, more abstractly, the rules that generate them.
- ✓ Students learn that any line, regardless of orientation, can be made into a number line by first locating zero, choosing a unit length, and partitioning the length-unit into fractional lengths.
- ✓ Students learn that a second number line, perpendicular to the first, creates an efficient, precise way to describe the location of these points. Points can be located using coordinate pairs, by starting at the origin, travelling a distance of units along the -axis, and units along a line parallel to the -axis.
- ✓ Students describe given points using coordinate pairs as well as use given coordinate pairs to plot points.
- ✓ Students plot points and using them to draw lines in the plane.
- ✓ Students use given rules (e.g., multiply by 2, then add 3) to generate coordinate pairs, plot points, and investigate relationships. Patterns in the resultant coordinate pairs are analyzed, leading students to discover that such rules produce collinear sets of points.
- ✓ Students generate two number patterns from two given rules, plot the points, and analyze the relationships within the sequences of the ordered pairs.
- ✓ Students analyze the effect on the steepness of the line when the second coordinate is produced through an addition rule as opposed to a multiplication rule.
- ✓ Students also create rules to generate number patterns, plot the points, connect those points with lines, and look for intersections.
- ✓ Students draw figures in the coordinate plane by plotting points to create parallel, perpendicular, and intersecting lines. They reason about what points are needed to produce such lines and angles, and then investigate the resultant points and their relationships. Students also reason about the relationships among coordinate pairs that are symmetric about a line.

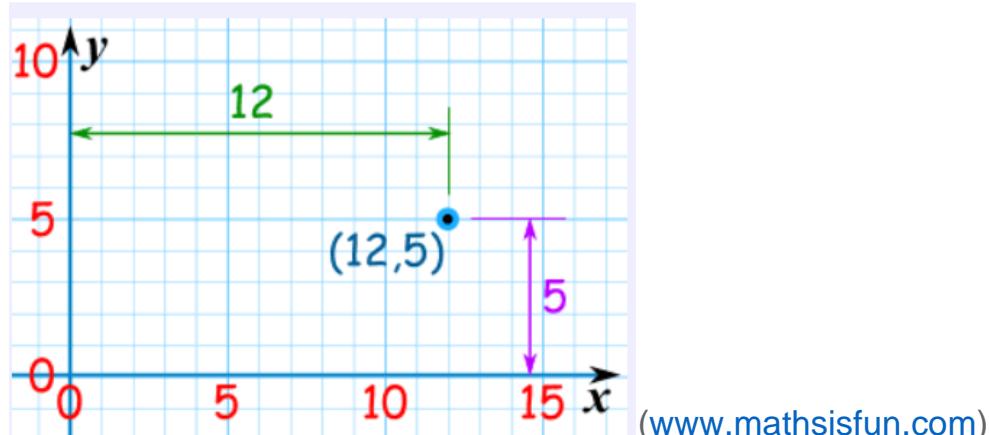
Terminology:

- ✓ Coordinate Plane – the plane containing the x and y axis



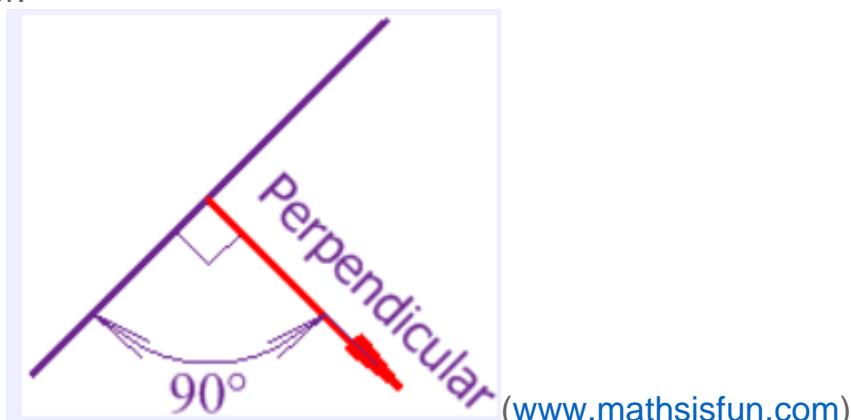
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- ✓ **Coordinates** – a set of values that show an exact position. **Coordinate Pairs**, are a set of numbers that shows the distance along and up the plane. Ex: (12,5) is 12 units along and 5 units up on the plane.



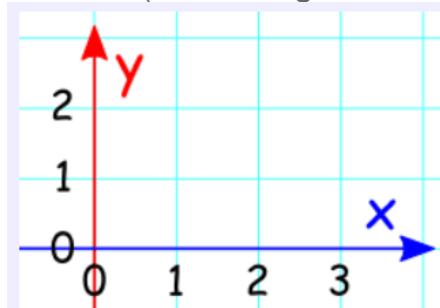
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- ✓ **Perpendicular Lines** – Lines that are at right angles of 90 degrees to each other.



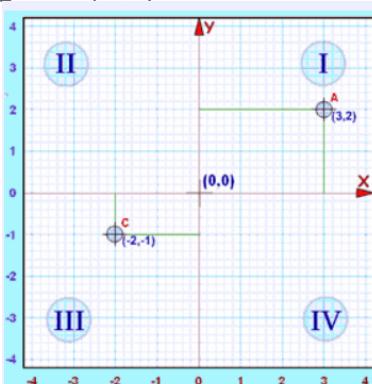
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- ✓ **Axis** - a reference line drawn on a graph that you measure from to find values. On the graph below, you can see the y axis (up and down from zero) and the x axis (left and right of zero)



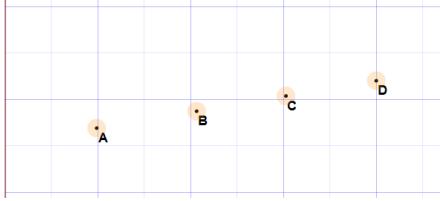
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- ✓ **Origin** – the starting point. On a number line it is 0 . On a two-dimensional graph, the origin is $(0,0)$



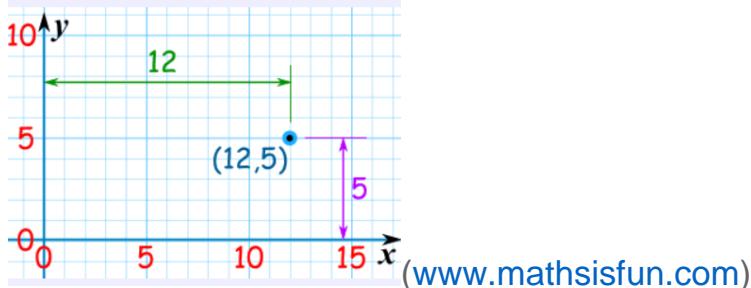
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- ✓ **Collinear** – When three or more points lie on a straight line. (Note: Two points make a line, and would always be collinear.)



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- ✓ **Ordered Pairs** - Two numbers written in a certain order like $(12,5)$ that are used to show the position on a graph where "x" is the first value (horizontal) and "y" is the second value (vertical).



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Activities you can do at Home:

- ✓ Play online math games on Sum Dog or do practice sets on TenMarks
- ✓ Create a treasure hunt with a map created using coordinate planes. See if your student can find the treasure using just the coordinates.
- ✓ Have students draw pictures using coordinate planes.
<http://www.superteacherworksheets.com/mystery-graph-picture.html> has several mystery graphs to select from!
- ✓ Consider reading *The Fly on the Ceiling*