Plot Points in the Cartesian Coordinate System

A. The Cartesian (or rectangular) coordinate system

1. Formed by two perpendicular axes (number lines) intersecting at the origin.
2. The intersecting axes form four quadrants labeled I – IV starting in the upper right and numbering counter-clockwise.
3. Each point has both an $x$-value and a $y$-value called the coordinates of the point.
4. An ordered pair $(x, y)$ lists the coordinates in parentheses with the $x$-value first.

Example 1 Plot each point.

a) (2, 5)  

c) (0, -1)  

e) $\left(\frac{5}{2}, \frac{-9}{2}\right)$

Example 2 List the ordered pair for each point shown.

A) B) C) D) E) F) G)

Determine Whether an Ordered Pair is a Solution to a Linear Equation.

A. Linear equation in two variables.

1. A linear equation can be put into the form $ax + by = c$ or $y = ax + b$ where $a$, $b$, and $c$ are real numbers.

   $2x - 3y = 8$  
   $y = 2x - 7$  
   $-x + 4 + 8y = 0$
2. Relationship between $x$ and $y$ values.

$$y = -4x + 3$$

<table>
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<tr>
<th>x</th>
<th>y</th>
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3. How many possible solutions?

B. Determine if an ordered pair is a solution to the equation.

**Example 3** Check if the ordered pair satisfies the given equation.

a) $3x - 2y = 6$

i. $(4, 0)$

ii. $\left(\frac{2}{3}, -2\right)$

b) $4x - 3y = 13$

i. $(-1, 3)$

ii. $(1, -3)$

C. Graph of an Equation.

A graph of an equation in two variables is an illustration of the set of points whose coordinates satisfy the equation.

**Example 4** $y = -4x + 3$