

Mini-Lecture 1.5

Rectangular Coordinates and Graphs of Equations

Learning Objectives:

1. Plot points in the rectangular coordinate system.
2. Determine whether an ordered pair is a point on the graph of an equation.
3. Graph an equation using the point-plotting method.
4. Identify the intercepts from the graph of an equation.
5. Interpret graphs.

Preparing for Rectangular Coordinates and Graphs of Equations:

i) Determine whether $x = 1$ is a solution to the equation: $3 - 4(2x - 5) = -9$.

ii) Solve the equation for y : $2x - 5y = -10$.

DEFINITION

The **graph of an equation in two variables** x and y is the set of all ordered pairs (x, y) in the xy -plane that satisfy the equation.

Examples:

1. Determine whether the given point is on the graph of the equation.

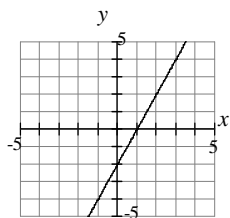
a) $4x - 3y = -3$; $(-3, -3)$

b) $y = -x^2 + 2$; $(-2, 6)$

DEFINITION

The **intercepts** are the points, if any, where a graph crosses or touches the coordinate axes. The x -coordinate of a point at which the graph crosses or touches the x -axis is an **x -intercept**, and the y -coordinate of a point at which the graph crosses or touches the y -axis is a **y -intercept**.

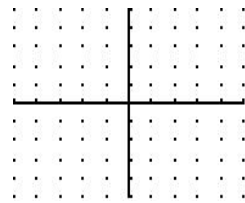
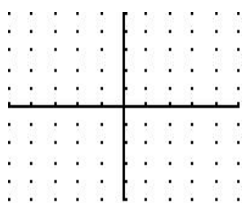
2. The graph of an equation is given. List the intercepts.



3. Graph the equation by plotting points.

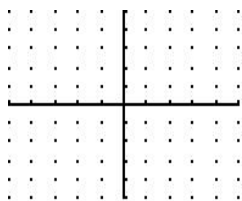
a) $y = -2x$

b) $y = \frac{3}{4}x - 2$

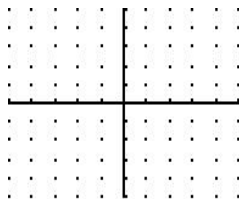


c) $x - 3y = -6$

d) $y = -x^2 + 2$



e) $y = |x - 3|$



4. If $(a, -5)$ is a point on the graph of $3x + y = -2$, what is a ?

5. If $(2, b)$ is a point on the graph of $y = x^2 - 3x + 1$, what is b ?