1. Approximate the real solution/s to the system of equations

$$x^2 + y^2 = 25$$
$$4y + 3x = 0$$

2. Approximate the real solution/s to the system of equations

$$x^2 + y^2 = 25$$
$$4y + 3x = -32$$

3. Approximate the real solution/s to the system of equations (bonus: find all real or non-real solutions to this)

$$x^2 + y^2 = 25$$
$$(x-3)^2 + y^2 = 4$$

4. Approximate the solution/s to the real system of equations

$$x^2 + y^2 = 25$$
$$\frac{y^2}{36} + \frac{x^2}{4} = 1$$

5. Approximate the real solution/s to the system of equations

$$x + y = 8$$
$$-2y = 2x - 16$$

6. Approximate the real solution/s to the system of equations

$$x + y = 8$$
$$-2y = 2x - 10$$

7. Approximate the solution/s to the real system of equations

$$x^2 + y^2 = 25$$
$$\frac{x^2}{4} - \frac{y^2}{36} = 1$$

8. Approximate the solution/s to the real system of equations

$$x^2 + y^2 = 25$$
$$\frac{x^2}{25} - \frac{y^2}{36} = 1$$

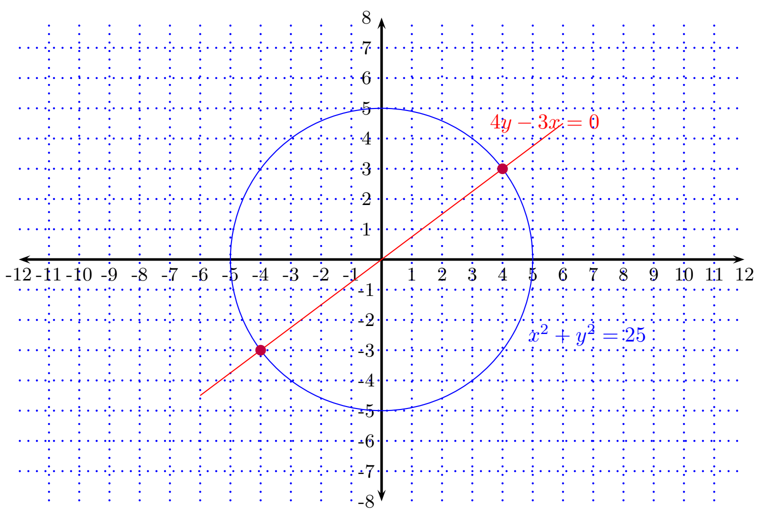
The Idea here is to begin to understand what it means to solve a system of equations and to consider the various possibilities. The most natural way to approach this is to do so by graphing. First, consider by a system of equations we mean one or more equations, usually with variables in them. By a solution to an equation we usually mean a value for each of the variables for which the equation holds true. By a *solution to the system of equations* we usually mean a value for each of the variables for which *all* the equations in the system hold true. The most natural way to approach this is to take each equation, and graph all the solutions to it. Then, do likewise for each of the equations in the system. Then each graph represents the solutions to the corresponding equation, thus points where the graphs intersect are points for which all of the corresponding equations hold true. Said a different way, to solve a system, we could simply graph each of the equations and find the points where the graphs intersect. The clarity and accessibility of this method make it a very important one. On the other hand, reading the precise points where graphs intersect may or may not be a very accurate affair. If accuracy is important, as is in some cases, this method leaves something desired. In the following sections we will look at other ideas which in many cases will offer a more accurate solution.

EXAMPLE 1
Approximate the solution to the system of equations

$$x^2 + y^2 = 25$$

$$4y - 3x = 0$$

SOLUTION:



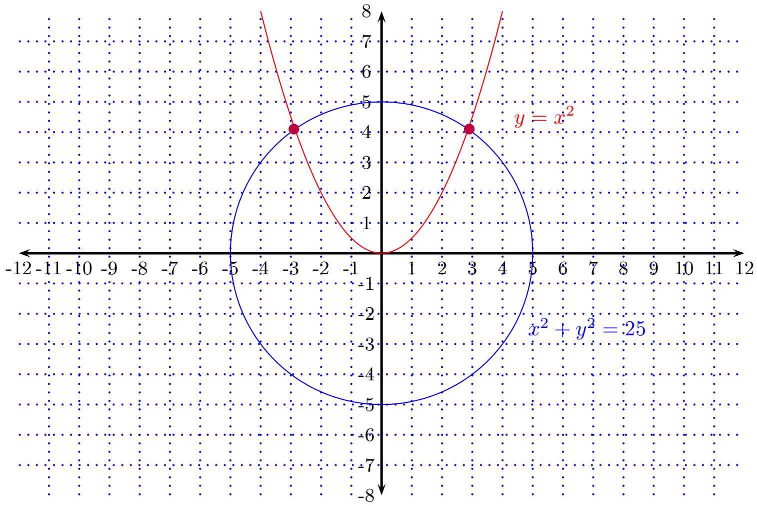
By inspecting the graph we see there are two solutions to the system. The one solutions is $(4, 3)$. Sometimes this solutions is also represented as $\{x = 4,\ y = 3\}$. Similarly the other solutions is represented by $(-4, -3)$ or by $\{x = -4,\ y = -3\}$

EXAMPLE 2
Approximate the solution to the system of equations

$$x^2 + y^2 = 25$$

$$y = x^2$$

SOLUTION:



By inspecting the graph we see there are two solutions to the system. From the graph we can get an approximation for the solution points. These are, approximately,

$$(2.8, 4.3)$$

and

$$(-2.8, 4.3)$$