Chapter 7 Systems of Equations

7-1 By Graphing

A system of equations is two equations solved for two variables.

The solution to a system would be the ordered pair that satisfies both equations

We can solve a system in a few ways.

1. By graphing
2. By substitution
3. By elimination
4. By a combination.

} Each system will have one answer.

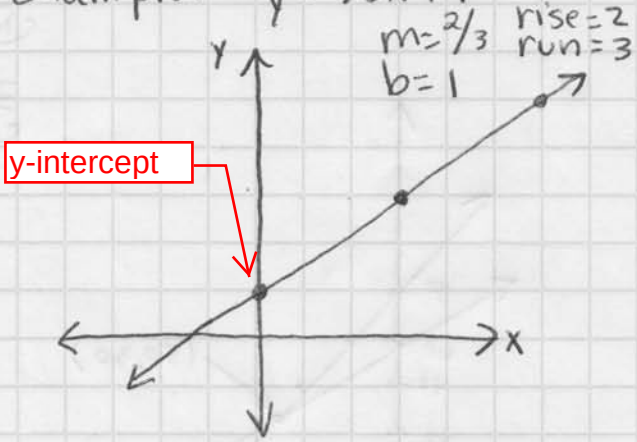
By graphing is the first method. Let's review graphing linear equations first.

In slope-intercept Form $y = mx + b$

Step 1: Plot the b on y-axis
Step 2: Identify rise and run from the slope
Step 3: Plot 2nd pt from y-int using rise and run
Step 4: Connect points

Example: $y = \frac{2}{3}x + 1$

$m = \frac{2}{3}$ rise = 2 run = 3
$b = 1$

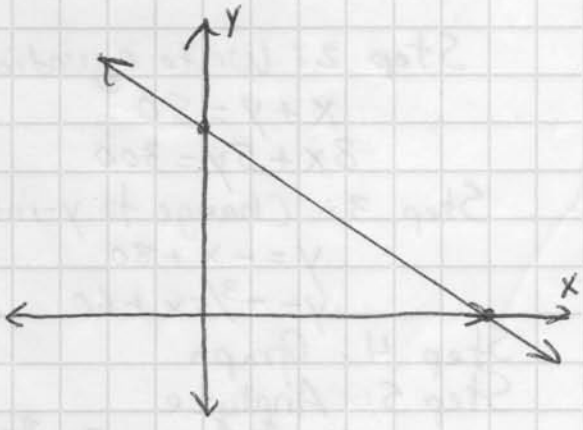


In Standard Form $Ax + By = C$

Step 1: Replace x with 0 Solve for y
Step 2: Plot y on y-axis
Step 3: Replace y with 0 Solve for x
Step 4: Plot x on x-axis
Step 5: Connect points

Example: $2x + 3y = 12$

$2(0) + 3y = 12 \quad y = 4$
$2x + 3(0) = 12 \quad x = 6$



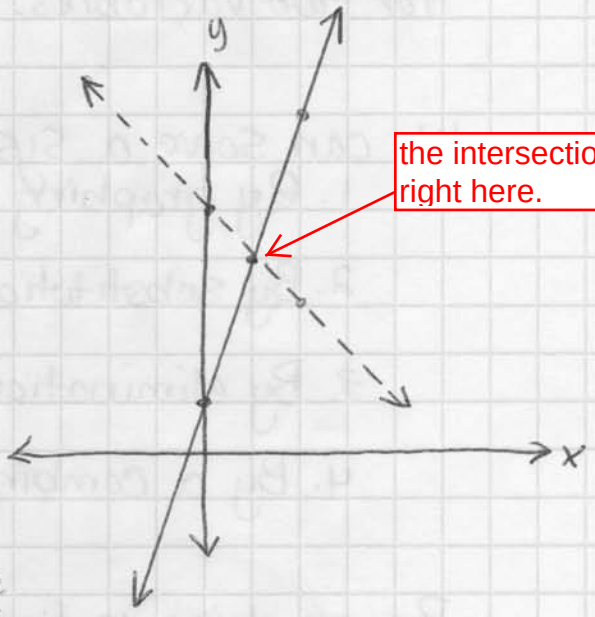
When we have a system of two equations, we can graph them both to see where they intersect. These coordinates represent the solution.

Here's what I mean:

we use brackets to show a system

$$\begin{cases} y = 3x + 1 \\ y = -x + 5 \end{cases}$$

Graph them both on the same coordinate plane



Where do the two lines intersect?

(1, 4)

That means $x = 1$, $y = 4$

You can plug x & y back into the equations to check if it satisfies <u>both</u> equations.

Solving a system by graphing can be difficult when the solution doesn't exactly lie on the corner. In those cases we estimate the x & y values.

Let's look at a real-life example:

Example: Several books are on sale at a store. Some cost $5.00 while others are $3.00. One day last week 80 books were sold. The total amount of the sales was $300.

Step 1: Organize data

$x =$ \$3 books

$y =$ \$5.00 books

Step 2: Write equations

$x + y = 80$

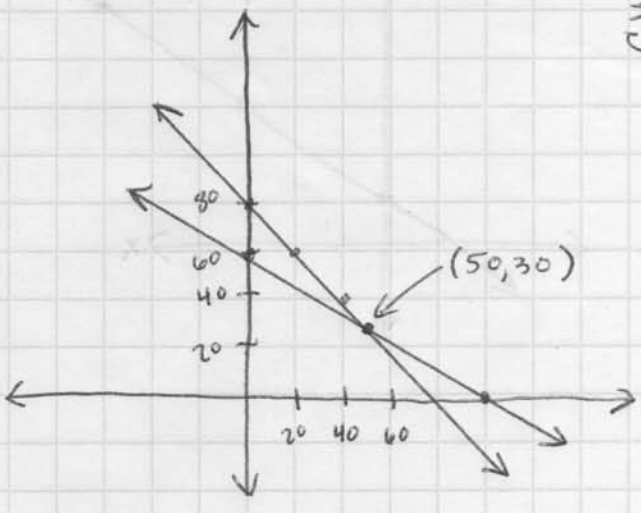
$3x + 5y = 300$

Step 3: Change to y-int form

$y = -x + 80$

$y = -\frac{3}{5}x + 60$

Step 4: Graph



Step 5: Analyze

50 - \$3 books 30 - \$5 books

C.W. Graphing Systems worksht.

H.W. Pg 323 (11-21 odds, 43)