Chapter 7, Lesson 5

Click for Video

$x + y = 5$ $\quad$ $1 + y = 5$
$y = x + 3$ $\quad$ $y = 4$

$x + y = 5$ $\quad$ $4 = 1 + 3$
$x - y = -3$ $\quad$ $4 = 4$

$2x = 2$ so $x = 1$ $\quad$ (1,4) - 1 solution

$x + y = 5$
$y = -x + 3$

$x + y = 5$ $\quad$ The two numbers
$x + y = 3$ $\quad$ should be the same!

$x + y = 5$ $\quad$ This is inconsistent for
$-x - y = -3$ $\quad$ it makes no sense.

$0 = 2$ False equation - 0 solutions

$x + y = 5$ The equations look

$\underline{y = -x + 5}$ different.

$x + y = 5$ Standard forms are

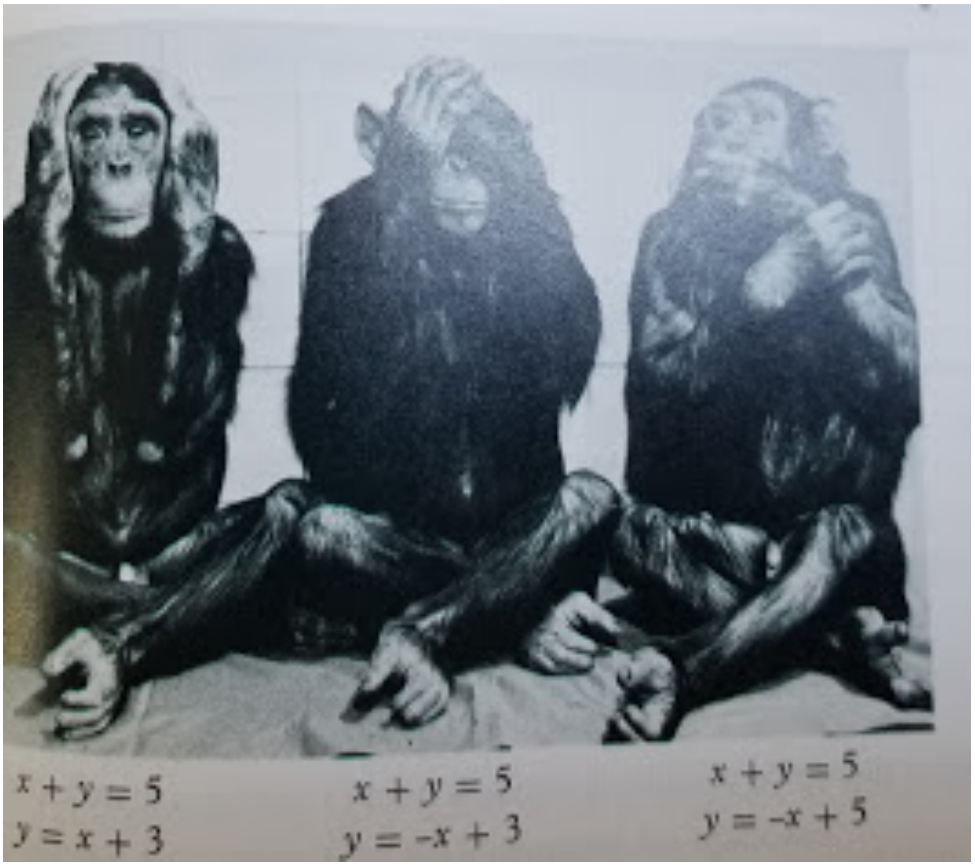
$\underline{x + y = 5}$ the same!

$x + y = 5$ What if you apply the

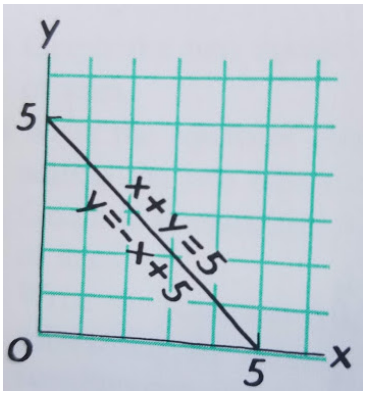
$\underline{-x - y = -5}$ subtraction method?

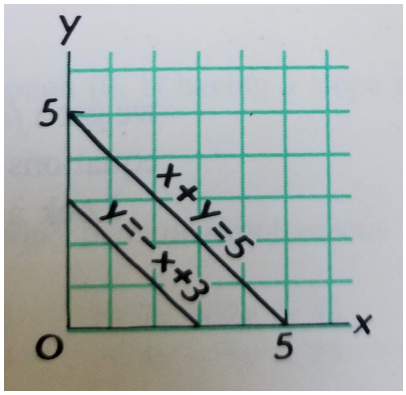
$0 = 0$ True equation - ∞ solutions

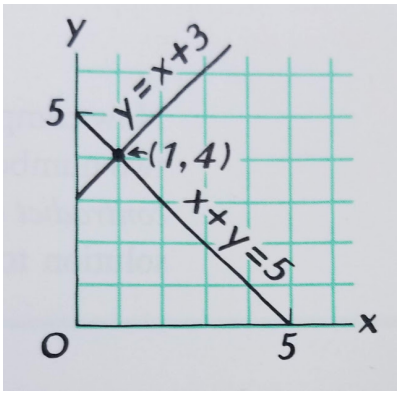
All variables drop out.



Which graph looks like 0 solution, 1 solution, or ∞ solutions?





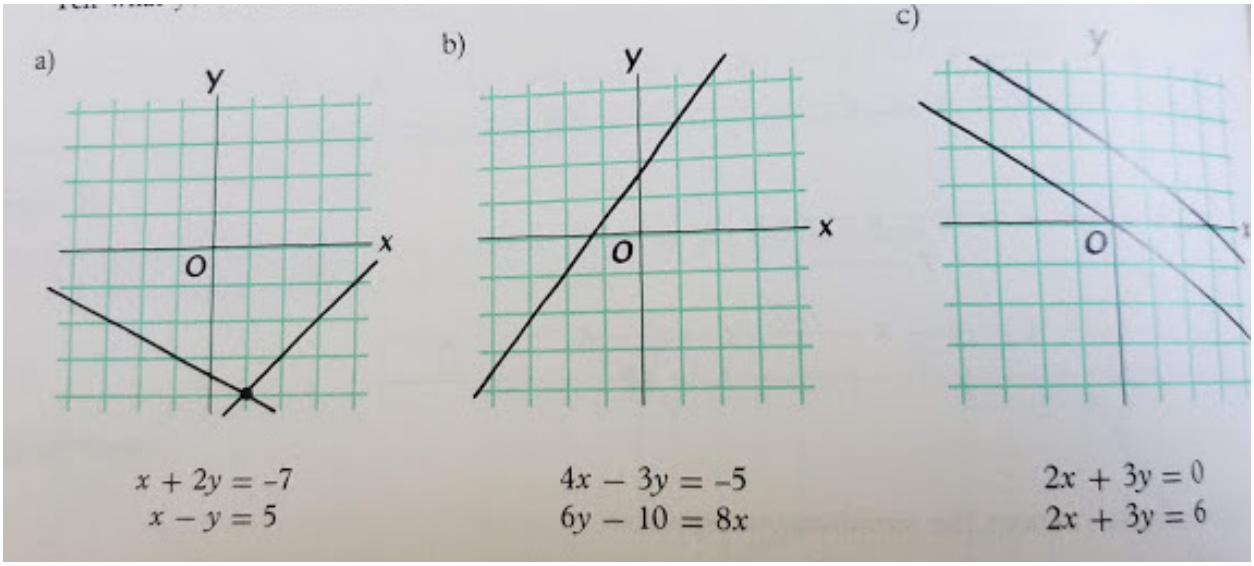


0 solutions - if the lines never meet, then there is no solution which means the lines are _____.

1 solution - the lines _____ at one point only.

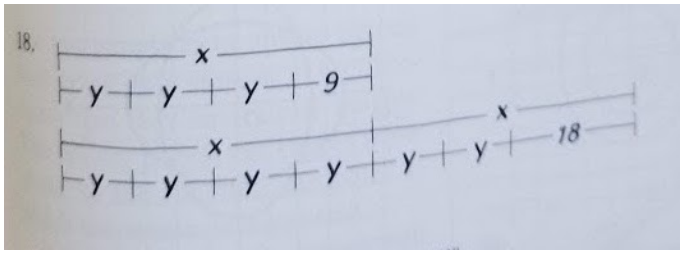
∞ solution - equations are equivalent so the graphs are the _____.

When looking at graphs of simultaneous equations, you can easily tell the answer!



Example from Set III

$$x - 3y = 9$$
$$\underline{2x - 6y = 18}$$



$-2(x - 3y = 9)$
$\underline{2x - 6y = 18}$

$0 = 0$

$-2x + 6y = -18$
$\underline{2x - 6y = 18}$

Infinite solutions

READ DIRECTIONS!

* Graph on real graph paper when the directions say to graph.

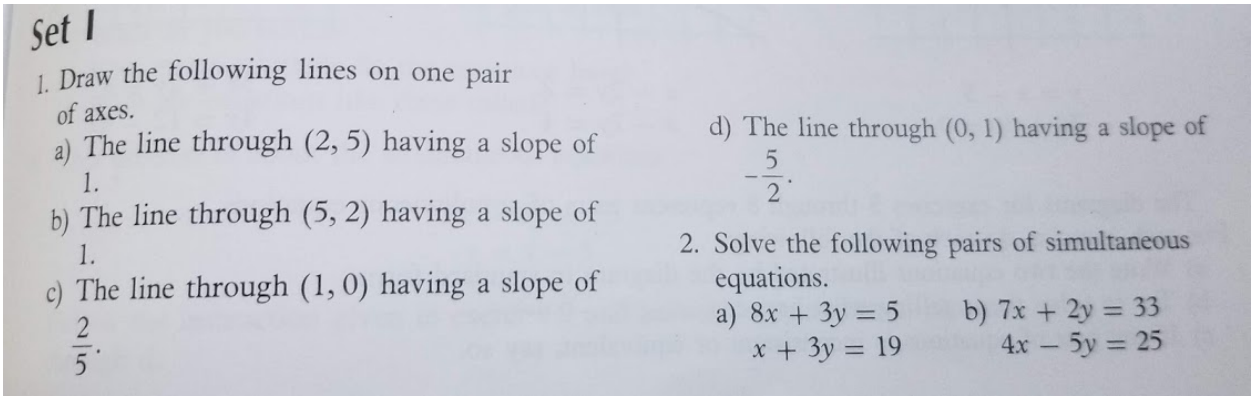
* Solve simultaneous equations only when the directions say.

* Some of you worked too hard because you did not read instructions.

Homework

For example, the directions for 1 say to graph a to d on the same pair of axes.

The directions for 2 do not require any graphing.

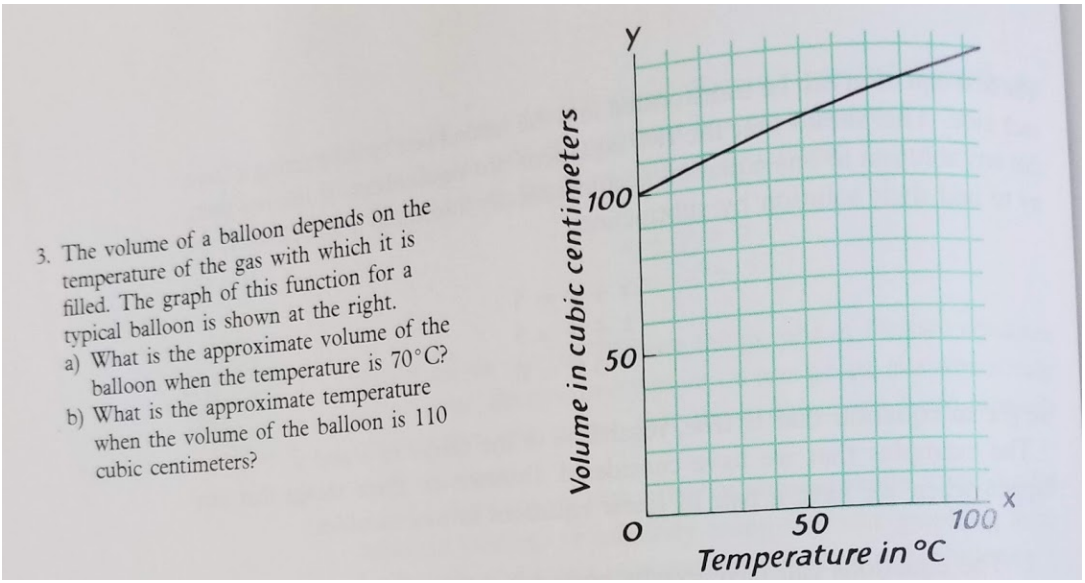


Set 1

1. Draw the following lines on one pair of axes.
   a) The line through $(2, 5)$ having a slope of 1.
   b) The line through $(5, 2)$ having a slope of 1.
   c) The line through $(1, 0)$ having a slope of $\frac{2}{5}$.
   d) The line through $(0, 1)$ having a slope of $-\frac{5}{2}$.

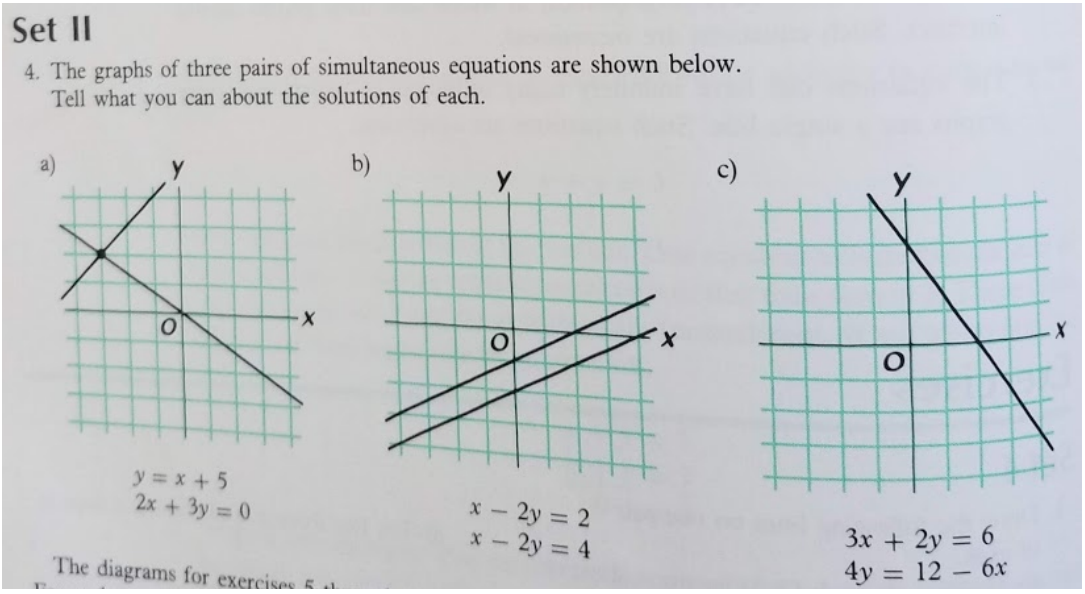
2. Solve the following pairs of simultaneous equations.
   a) $8x + 3y = 5$, $x + 3y = 19$
   b) $7x + 2y = 33$, $4x - 5y = 25$

Problem 3 should take a few minutes for you are reading a point on a graph.



3. The volume of a balloon depends on the temperature of the gas with which it is filled. The graph of this function for a typical balloon is shown at the right.
   a) What is the approximate volume of the balloon when the temperature is 70°C?
   b) What is the approximate temperature when the volume of the balloon is 110 cubic centimeters?

Problem 4 does not require problem solving. The video and this file explains what to do.



Set II

4. The graphs of three pairs of simultaneous equations are shown below. Tell what you can about the solutions of each.

a)

$y = x + 5$
$2x + 3y = 0$

b)

$x - 2y = 2$
$x - 2y = 4$

c)

$3x + 2y = 6$
$4y = 12 - 6x$

The diagrams for exercises 5

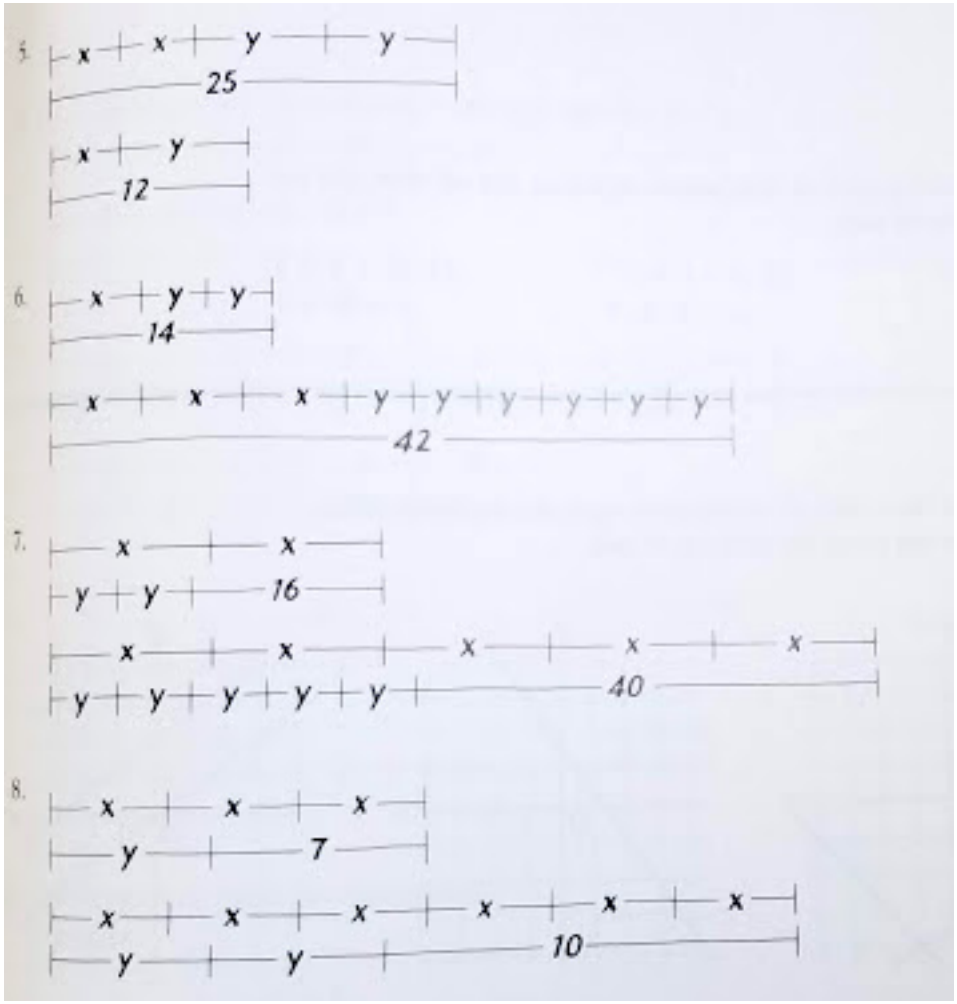
Problems 5 to 8 (just like 15 to 18) was demonstrated in this file and the video.

The diagrams for exercises 15 through 18 represent pairs of simultaneous equations. For each exercise, do each of the following:

a) Write the two equations illustrated by the diagram in standard form.

b) Try to solve them, telling what happens.

c) If any pair of equations is inconsistent or equivalent, say so.



Problems 9 and 10 give step by step instructions.

9. This exercise is about the simultaneous equations

$$2x + 5y = 10$$
$$2x + 5y = 0$$

a) Graph the two equations on one pair of axes.
b) What do you notice?
c) How many solutions do the equations have?
d) What are equations like these called?

10. This exercise is about the simultaneous equations

$$3x - 3y = 15$$
$$y = x - 5$$

Follow the instruction given in exercise 9 and answer the questions in parts b through d.

Problems 11 to 13 say to solve by graphing, not by writing equations.

Graph the following pairs of simultaneous equations and tell what you can about the solutions of each.

11. $6x - 2y = 12$
$y = 3x - 6$

12. $x - y = 1$
$x + 3y = -9$

13. $4x - y = 2$
$y = 4x + 1$