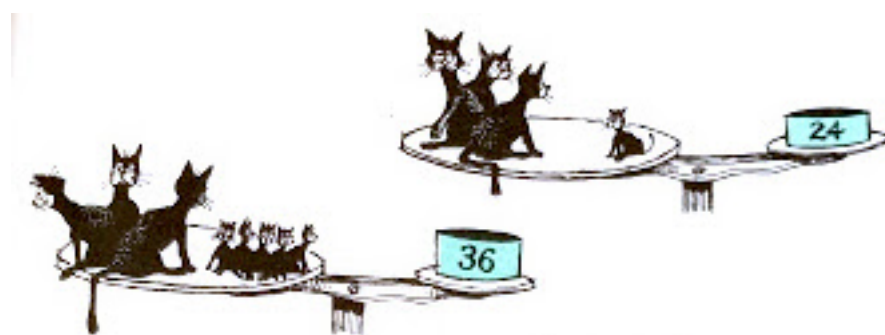


## Chapter 7, Lesson 2, Part 1

[Click for Video](#)

Riddle - Three cats and a kitten weigh 24 pounds; three cats and five kittens weigh 36 pounds. How much does a cat weigh? What is a kitten's weight?

Here is a picture:



Suppose  $x$  is the weight of a cat.

Suppose  $y$  is the weight of a kitten.

How would you set up two equations?

$$\begin{array}{r} 3x + y = 24 \\ + 3x + 5y = 36 \\ \hline \end{array}$$

Addition method:  $6x + 6y = 60$

EPIC FAIL! Why?

If only there was a way to make one of the  $3x$ 's negative.

You can!

There's an addition method. Shouldn't there be a subtraction method?

Yes, there is!

Instead of adding the equations, you will subtract one from the other.

$$\begin{array}{r} 3x + y = 24 \\ - (3x + 5y = 36) \\ \hline \end{array}$$

The whole equation is subtracted.  
Every positive term becomes negative.

$$\begin{array}{r} 3x + y = 24 \\ -3x - 5y = -36 \\ \hline \end{array}$$

$$\begin{array}{r} -4y = -12 \\ -4 \quad -4 \end{array}$$

$$y = 3$$

Plug into either equation to solve for  $x$ .

$$\begin{array}{r} 3x + 3 = 24 \\ -3 \quad -3 \end{array}$$

$$\frac{3x = 21}{3 \quad 3}$$

$$x = 7$$

Plug into the OTHER equation to check.

$$3 \cdot 7 + 5 \cdot 3 = 36$$

$$21 + 15 = 36$$

$$36 = 36$$

From now on, the best way to show your solution is this: (7,3). There is a reason why and you will know in Lesson 4. I expect to see the solution written as a coordinate.

Here is a trickier example. Why? You have different signs in the equation and that throws off some people.

$$6x - 4y = 42$$

$$x - 4y = 17$$

$$6x - 4y = 42$$

$$\underline{-(x - 4y = 17)}$$

$$6x - 4y = 42$$

$$\underline{-x + 4y = -17} \quad \text{Flip the signs.}$$

$$\underline{5x = 25}$$

$$5 \quad 5$$

$$x = 5$$

Solve for y.

$$\begin{array}{r} 5 - 4y = 17 \\ -5 \qquad -5 \end{array}$$

$$\frac{-4y = 12}{-4 \quad -4}$$

$$y = -3$$

Check.

$$6 \cdot 5 - (4 \cdot -3) = 42$$

$$30 - (-12) = 42$$

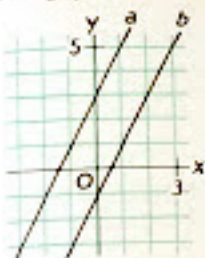
$$30 + 12 = 42$$

$42 = 42$  So,  $(5, -3)$  is the solution.

# Homework

## Set I

The following questions are about the lines shown in this graph.



- What is the slope of each line?
- What is the y-intercept of each line?
- What is the equation of line A?
- What is the equation of line B?

2. Write each of the following expressions as a sum.

- $x - y$
- $y - x$
- $x - y - z$
- $z - y - x$

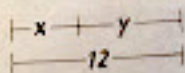
3. The Engulf and Devour Corporation pays its employees \$10 an hour but fines them 50 cents for each minute that they are late to work.

- Write a formula for the weekly pay,  $p$ , of someone who works  $h$  hours in a given week and is late a total of  $w$  minutes.
- If Minnie works 40 hours in one week and is late a total of 30 minutes, what is her pay for that week?
- Solve your formula of part a of this exercise for  $h$ .
- If Max is late a total of 80 minutes in one week but wants to earn \$450, how many hours must he work?

## Set II

1. This exercise is about the diagrams at the right.

- By comparing the two diagrams, figure out the length of one of the segments labeled  $x$ .
- Use your answer to part a to figure out the length of one of the segments labeled  $y$ .
- Write a pair of simultaneous equations for the diagrams.
- Use the subtraction method to solve the equations for  $x$  and  $y$ .



Lesson 2: Solving by Subtraction

The diagrams below represent pairs of simultaneous equations. Write the equations and solve them to find the lengths of the line segments in each diagram.

