Problems and systems	Season	01
	Episode	AP13
	Time frame	1 period

Prerequisites : Solving a system.

Objectives :
- Translate word problems into systems and solve them.

Materials :
- *Cards with problems and systems.*
- *Answer sheet with 10 problems*

1 – Matching game : problems and systems — 15 mins

Each student is given a card with either a word problem or a system. Students mingle to match each problem with the corresponding system. Simplifications may havec occured in the equations, to make the matching harder.
Then, each pair has to solve the system and the problem.

2 – Speed contest : solving more problems — Remaining time

Still working in pairs, students have to solve has many problems has they can using systems.

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Problem 1

In a shop, all DVDs are the same price, and all CDs the same price (but different). Four DVDs and two CDs cost 130 €, while three DVDs and four CDs cost 135 €. Find out the price of one DVD and the price of one CD.

System : $\begin{cases} \ldots\ldots x + \ldots\ldots y = \ldots\ldots \\ \ldots\ldots x + \ldots\ldots y = \ldots\ldots \end{cases}$ **Solution :** $(\ldots\ldots, \ldots\ldots)$

Problem 2

Simon has 40 books. Some are 5cm wide, others only 3cm. If he could put them all on the same shelf, it would make a total length of 1,80 m.
How many books of each kind does Simon have ?

System : $\begin{cases} \ldots\ldots x + \ldots\ldots y = \ldots\ldots \\ \ldots\ldots x + \ldots\ldots y = \ldots\ldots \end{cases}$ **Solution :** $(\ldots\ldots, \ldots\ldots)$

Problem 3

In a desert caravan, there are some dromedaries (1 hump) and some bactrian camels (two humps), there are 28 heads and 45 humps. Find out the number of dromedaries.

System : $\begin{cases} \ldots\ldots x + \ldots\ldots y = \ldots\ldots \\ \ldots\ldots x + \ldots\ldots y = \ldots\ldots \end{cases}$ **Solution :** $(\ldots\ldots, \ldots\ldots)$

Problem 4

Find a fraction such that, if you add 3 to the numerator and to the denominator, you find $\frac{2}{5}$, and if you subtract 3 to the numerator and to the denominator, you find $\frac{1}{7}$.

System : $\begin{cases} \ldots\ldots x + \ldots\ldots y = \ldots\ldots \\ \ldots\ldots x + \ldots\ldots y = \ldots\ldots \end{cases}$ **Solution :** $(\ldots\ldots, \ldots\ldots)$

Problem 5

Find two numbers such that their difference is equal to 75 and when you divide the greatest by the lowest, the quotient is 4 and the remainder 21.

System : $\begin{cases} \ldots\ldots x + \ldots\ldots y = \ldots\ldots \\ \ldots\ldots x + \ldots\ldots y = \ldots\ldots \end{cases}$ **Solution :** $(\ldots\ldots, \ldots\ldots)$

Problem 6

In a two-digits number, the tens digit is 3 less than the units digit. If the order of the two numbers is changed, than the new number is 27 more than the first one. Give all the possible values for this number.

System : $\begin{cases} \ldots\ldots x + \ldots\ldots y &= \ldots\ldots \\ \ldots\ldots x + \ldots\ldots y &= \ldots\ldots \end{cases}$ **Solution :** $(\ldots\ldots, \ldots\ldots)$

Problem 7

A horse and a mule, carrying heavy bags, are walkiing side by side. As the horse was complaining about its load, the mule answered : "If I take three of your bags, my load will twice yours, but if you take three of mine, our loads will be equal". Find out the number of bags carried by each animal.

System : $\begin{cases} \ldots\ldots x + \ldots\ldots y &= \ldots\ldots \\ \ldots\ldots x + \ldots\ldots y &= \ldots\ldots \end{cases}$ **Solution :** $(\ldots\ldots, \ldots\ldots)$

Problem 8

"I have twice the age you had when I had the age that you have, and when you will have the age that I have now, the sum of our ages will be 90 years." Is it possible to find out the age of the narrator ? If so, what is it equal to ?

System : $\begin{cases} \ldots\ldots x + \ldots\ldots y &= \ldots\ldots \\ \ldots\ldots x + \ldots\ldots y &= \ldots\ldots \end{cases}$ **Solution :** $(\ldots\ldots, \ldots\ldots)$

Problem 9

To earn a bit of money for a school trip, a student has sold some gingerbreads and some honey pots. By selling them at the price of 4 € per gingerbread and 4.5 € per honey pot, his sales amounted to 215 €. If he had added 0.5 € to each item, the total would have been 240 €. How many of each item did he sell ?

System : $\begin{cases} \ldots\ldots x + \ldots\ldots y &= \ldots\ldots \\ \ldots\ldots x + \ldots\ldots y &= \ldots\ldots \end{cases}$ **Solution :** $(\ldots\ldots, \ldots\ldots)$

Problem 10

In a class of 35 pupils, the average mark in maths is 14.8 for the boys and 15.5 for the girls. We also know that the average for the whole class is 15.1. Find out the nummber of boys and girls.

System : $\begin{cases} \ldots\ldots x + \ldots\ldots y &= \ldots\ldots \\ \ldots\ldots x + \ldots\ldots y &= \ldots\ldots \end{cases}$ **Solution :** $(\ldots\ldots, \ldots\ldots)$

Document 1 10 problems

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Find two numbers such that their difference is equal to 75 and when you divide the greatest by the lowest, the quotient is 4 and the remainder 21.

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Document 2 10 systems

$\begin{cases} 2x+y &= 65 \\ 3x+4y &= 135 \end{cases}$	$\begin{cases} x+y &= 40 \\ 5x+3y &= 180 \end{cases}$
$\begin{cases} x+y &= 28 \\ x+2y &= 45 \end{cases}$	$\begin{cases} 5x-2y &= -9 \\ 7x-y &= 18 \end{cases}$
$\begin{cases} x-y &= 75 \\ x-4y &= 21 \end{cases}$	$\begin{cases} x-y &= -3 \\ -x+y &= 3 \end{cases}$
$\begin{cases} x-2y &= -9 \\ x-y &= 6 \end{cases}$	$\begin{cases} 3x-4y &= 0 \\ 3x-y &= 90 \end{cases}$
$\begin{cases} 0.9x+y &= 48 \\ 0.8x+0.9y &= 43 \end{cases}$	$\begin{cases} x+y &= 35 \\ 14.8x+15.5y &= 528.5 \end{cases}$