Mixtures [See 5.2: 68 - 69, 75 - 77 and 5.3: 42, 43]

These problems involve mixing two solutions or two other entities to form a final mixture. The solutions being mixed have different concentrations of a particular compound. A common solution that we can buy is rubbing alcohol which usually has 70% alcohol. The other 30% is usually distilled water. Another example could be salad dressing that usually has around 75% olive oil and the other main compound is vinegar.

You are given the percent concentrate of each solution and the amount of the final mixture along with its percent concentrate. You are looking for the amount of each solution being mixed. Here is the setup:

Let ***x*** = number of liters at ***some*** percent.
Let ***y*** = number of liters at ***another*** percent.

Description	**No. of liters, etc.**	**·**	**Percent of alcohol, etc.**	**=**	**No. of liters, etc., of alcohol, etc.**
1st Solution	***x***		<some percent> = .[some decimal]		.[some decimal]***x***
2nd Solution	***y***		<another percent> = .[another decimal]		.[another decimal]***y***
Final Solution	<final amount>		<final percent> = .[final decimal]		.[final decimal](<final amount>)

1st Equation ***2nd Equation***

Example: 5.2:43
You poured some 8% alcohol solution and some 12% alcohol solution into a mixing container. Now you have 680 grams of 10% alcohol solution. Write and solve a system of equations to find how many grams of 8% solution and how many grams of 12% solution you poured into the mixing container.

Let ***x*** = number of grams of 8% alcohol solution.
Let ***y*** = number of grams of 12% alcohol solution.

Description	**No. of grams**	**·**	**Percent of alcohol..**	**=**	**No. of grams of alcohol**
1st Solution	***x***		8% = .08		.08***x***
2nd Solution	***y***		12% = .12		.12***y***
Final Solution	688		10% = .10		.10(688)

$$\begin{cases} x + y = 688 \\ .08x + .12y = .10(688) \end{cases}$$