

## Mixture Problems

- #54 Let  $x$  represent the mass, in kg, of mints;  
let  $y$  represent the mass, in kg, of jelly beans.

	Before	After	
mass	$x + y$	500	$\begin{cases} x + y = 500 & \textcircled{1} \checkmark \\ 2.7x + 2.1y = 1260 & \textcircled{2} \end{cases}$
revenue	$2.70x + 2.10y$	$2.52 \times 500$	

From  $\textcircled{1}$ :  $y = 500 - x$   $\textcircled{1}'$

Sub into  $\textcircled{2}$ :  $2.7x + 2.1(500 - x) = 1260$

$$2.7x + 1050 - 2.1x = 1260$$

$$0.6x = 1260 - 1050$$

$$0.6x = 210, \quad x = \frac{210}{0.6} = \frac{2100}{6} = \frac{700}{2} = 350 \checkmark$$

Sub into  $\textcircled{1}'$ :

$$y = 500 - 350, \quad y = 150.$$

$\therefore$  The mass of mints is 350 kg.

## Chemical Solutions.

Solute  
↳ substance  
that is being  
dissolved

Solvent  
↳ the substance that  
dissolves smth else.

#60

Let  $x$  represent the mass, in kg, of 30% salt solution.  
Let  $y$  represent the mass, in kg, of 40% salt solution.

	Before	After
mass	$x + y$	200
pure substance	$0.3x + 0.4y$	$0.37 \times 200$

$$\begin{cases} x + y = 200 \text{ ①} \\ 0.3x + 0.4y = 74 \text{ ②} \end{cases}$$

From ①:  $x = 200 - y$  ①'

Sub into ②':

$$0.3(200 - y) + 0.4y = 74$$

$$60 - 0.3y + 0.4y = 74$$

$$0.1y = 74 - 60$$

$$0.1y = 14, \quad y = \frac{14}{0.1} = 140$$

Sub  $y = 140$  into ①'

$$x = 200 - 140$$

$$x = 60.$$

∴ 60 kg of 30% solution and 140 of 40%  
is needed.