

Problem Solving Part 1: Mixture Problems

REVIEW: A **percent** is parts per hundred.

Example 1:

A 50% alcohol solution has 50% alcohol and 50% water.

A 60% alcohol solution 60% alcohol and 40% water.

Example 2:

A chemist has 200 gallons of a 30% acid solution. How many gallons of pure acid is in the solution?

We can use the following formula to solve this problem.

$$\left(\begin{array}{c} \text{amount} \\ \text{of solution} \end{array} \right) \times \left(\begin{array}{c} \text{percent} \\ \text{of acid} \end{array} \right) = \left(\begin{array}{c} \text{amount} \\ \text{of acid} \end{array} \right)$$

NOTE: Percentages must be converted to decimals first.

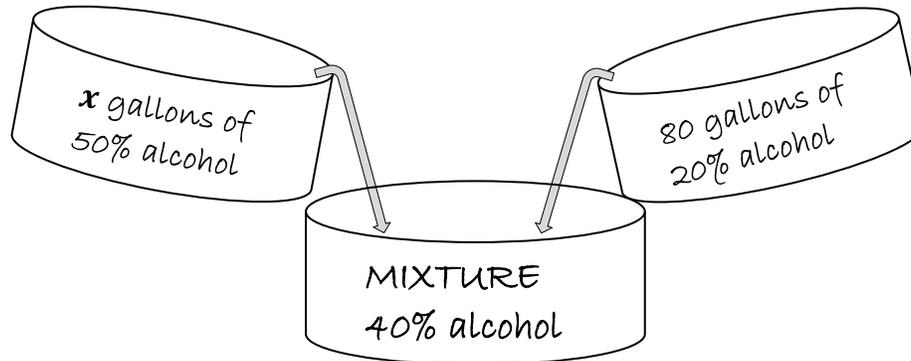
$$(200 \text{ gallons}) \times (0.30) = \underline{\hspace{2cm}} \text{gallons}$$

This means that there are gallons of pure acid and gallons of water.

A MIXTURE PROBLEM:

Example 3:

How many gallons of 50% alcohol must be mixed with 80 gallons of 20% alcohol to get a mixture that is 40% alcohol?



Since there are x gallons in the first solution and 80 gallons in the second solution, and we are mixing the two solutions to make one big mixture, there must be $(x + 80)$ gallons in the mixture.

We must organize all of this information into a table in order to solve the problem.

	Amount of Solution	Percent Alcohol	Amount of Alcohol
Solution 1: 50% alcohol			
Solution 2: 20% alcohol			
Final Mixture: 40% alcohol			

Now that the table is filled out. We can write an equation to solve for x .

RECALL:

$$\left(\begin{array}{l} \text{alcohol amount} \\ \text{of solution 1} \end{array} \right) \times \left(\begin{array}{l} \text{alcohol amount} \\ \text{of solution 2} \end{array} \right) = (\text{Final Mixture})$$

So our equation becomes:

$$0.50x + 0.20(80) = 0.40(x + 80)$$

Solve for x .

Problem Solving Part I

Practice Problems

How many liters of a 20% acid solution must be mixed with 12 liters of a 12% acid solution to get a mixture that is 14% acid?

	Amount of Solution	Percent Acid	Amount of Acid
Solution 1: 20% acid			
Solution 2: 12% acid			
Final Mixture: 14% acid			