Word Problems in 1 variable: Part 7 (Mixture)

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Online Tutorial Series

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Definitions

- Solute – Part of the Solution, dissolved by the Solvent. If water and other solvent were added, %sol(sol/soln) becomes smaller.
- Solvent – Part of Solution, dissolves the solute. If salt, powder and other solute were added, %solv(solv/soln) becomes smaller.
- Solution = Solute + Solvent

Sample Problem

1. How much water should you add to 25% concentrated 20L solution to make it 20% concentrated

Solution

R: Let x be the amount of water added

E: amount solute = (conc)(vol)

(25/100)(20) + 0 = (20/100)(20+x)

***note: we added 0 because addition of water has no effect on the amount of solute.

S: 5 = 1/5(20+x)

5 = 4 + (1/5)(x)

1=(1/5 x); x = 5

I: You should add 5 L.

Sample Problem

2. How much salt should you add to 25% 48L brine solution to make it 40% concentrated?

Solution

R: Let x be the amount of salt added

E: amount solute = (conc)(vol)

(25/100)(48) + x = (40/100)(48+x)

***notice that here we added pure x because pure salt increases the amount of salt by x

S: ¼ (48) + x = (2/5)(48+x)

12 + x = (96/5) + (2/5)(x)

Solution

…$12 + x = (96/5) + (2/5)(x)$

$12 + (3/5)(x) = 96/5$

$60 + 3x = 96$

$3x = 36$

$x = 12$

I: You should add 12 L of salt.