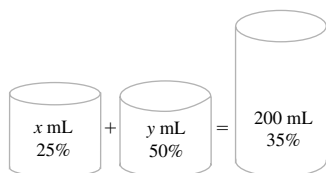


Word Problem on Systems of Linear Equations: Problem Type 4

• Example 1

A chemist has a 25% and a 50% acid solution. How much of each solution should be used to form 200 mL of a 35% acid solution?



The unknowns in this case are the amounts of the 25% and 50% solutions to be used in forming the mixture.

We use two variables to represent the two unknowns. Let x be the amount of the 25% solution and y the amount of the 50% solution. Let's draw a picture before proceeding to form a system of equations.

Now, to form our two equations, we want to consider two relationships: the *total amounts* combined and the *amounts of acid* combined.

From our sketch of the problem, we have

Total amounts combined. $x + y = 200$ (1)

Amounts of acid combined. $0.25x + 0.50y = 0.35 \cdot 200$ (2)

Solving the system of equations, we get

$$x = 120 \text{ mL} \quad (25\% \text{ solution})$$

$$y = 80 \text{ mL} \quad (50\% \text{ solution})$$

• • • CHECK YOURSELF 1

A pharmacist wants to prepare 300 mL of a 20% alcohol solution. How much of a 30% solution and a 15% solution should be used to form the desired mixture?

• • • CHECK YOURSELF ANSWER

- 100 mL of the 30% and 200 mL of the 15%.

2.36 Exercises

Name _____

Section _____

Date _____

A N S W E R S

1. _____

2. _____

3. _____

4. _____

Solve each mixture problem.

- 1. Science.** A chemist mixes a 10% acid solution with a 50% acid solution to form 400 mL of a 40% solution. How much of each solution was used in the mixture?

- 2. Science.** A laboratory technician wishes to mix a 70% saline solution and a 20% solution to prepare 500 mL of a 40% solution. What amount of each solution should be used?

- 3. Science.** A chemist mixes a 30% acid solution with a 60% acid solution to form 500 mL of a 48% solution. How much of each solution was used in the mixture?

- 4. Science.** A pharmacist wants to prepare 100 ml of a 10% acid solution . How much of a 5% solution and a 15% solution should be used to form the desired mixture?