# MIXTURE PROBLEMS

1. A grocer wishes to mix one-dollar coffee with 80-cent coffee to produce a mixture of 200 pounds to sell for 84 cents a pound. How many pounds of each kind should he use?
   Hint: Try making a table like this:

| Kind | Number of Pounds | Value in Cents |
|---|---|---|
| $l coffee | N | 100n |
| 80-cent coffee | 200 – n | 80(200 – n) |
| 84-cent coffee | 200 | 200 84 |

   Why do we use 200 – n to represent the number of pounds of 80-cent coffee?
   Hence, 100n + 80 (200 – n) = 16,800
   Complete the solution.

2. A grocer wishes to mix $120 tea with $1.50 tea to make a mixture of 60 pounds worth $1.30 a pound. How many pounds of each kind must he mix?

3. A merchant wishes to mix walnuts selling at $2.25 a pound with almonds selling at $2.40 a pound so as to make a mixture of 120 pounds worth $2.30 a pound. How many pounds of each kind of nuts must he use?

4. How much water must be added to 12 quarts of a 10% solution of salt and water to reduce to a 6% solution?
   Solution: First, do you know what we mean by a 10% solution of salt and water? It means that the solution contains 10% salt and 90% water.

   We can write equations showing this relationship either in terms of the amount of salt in the two mixtures or in terms of the amount of water in the mixtures

IN TERMS OF SALT

Amt of salt in original solution — Amt of salt in new solution

.10(12 qts) 016(12+ x) qts
Since no salt was added to the original Solution nor taken away from it, then

.10(12) = .06(12) + x
1.2 = .72 + .06x
.48 = .06x
8 qts = x

IN TERMS OF WATER

Amt of water in original solution — Amt of water added — Amt of water in new solution

.90 (12 qts) x qts .94 (12 + x) qts
The amount of water in the new solution is made up of the water that was in the original solution plus what was added; so..

.90 (12) + x = .94 (12 + x)
10.8 + x = 11.28 + .94x
.06x = .48
x = 8qts

5. A pharmacist has 4 quarts of a 15% solution of iodine. How much alcohol must he add to reduce it to a 10% solution?

6. How much water must be added to 30 quarts of a 75% solution of acid to reduce it to a 15% solution?

7. How much pure disinfectant must be added to 30 gallons of an 8% solution to increase its strength of 25%?

8. The radiator of an automobile already contains 12 quarts of a 10% solution of alcohol. How much alcohol must be added to make a mixture of 20% alcohol?

9. How much alcohol must be added in exercise 8 to make a mixture containing 25% alcohol?

10. How many quarts of milk containing 4% butter fat and how many quarts of cream containing 29% butter fat must be mixed to make 40 quarts of cream containing 20% butter fat?

11. How many quarts of a solution half of which is acid must be added to 10 quarts of a solution one-fifth of which is acid to form a solution which is three-tenths acid?