**Mixture & Alligation**

**Types of Mixtures**

Mixture is based on the concept of weighted average.

**Simple Mixture:** When two different ingredients are mixed together, it is known as a simple mixture.

**Compound Mixture:** When two or more simple mixtures are mixed together to form another mixture, it is known as a compound mixture.

Important Points:-

1. When two ingredients are mixed together in different ratios to form a mixture, the ratio of the quantities of the two constituents is given by

Qc: Qd = (d-m): (m-c)

Qc = Cheaper Quantity

Qd = Dearer Quantity

c = Cost Price of unit quantity of cheaper

d = Cost Price of unit quantity of dearer

m = Cost Price of unit quantity of mixture.

1. In x gram mixture of milk and water, milk is p %. To make the quantity of milk in the mixture to be q %, the quantity of milk added to the mixture will be  
    =x{(q-p)/(100-q)} (See Example 1)
2. Suppose a container contains *x* of liquid from which *y* units are taken out and replaced by water.

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| After *n* operations, the quantity of pure liquid = | http://www.indiabix.com/_files/images/aptitude/1-sym-obracket-h2.gif | *x* | http://www.indiabix.com/_files/images/aptitude/1-sym-oparen-h1.gif | 1 - | *y* | http://www.indiabix.com/_files/images/aptitude/1-sym-cparen-h1.gif | *n* | http://www.indiabix.com/_files/images/aptitude/1-sym-cbracket-h2.gif | units. |
| *x* |

1. If P1 and P2 are the prices of two quantities Q1 and Q2, then the average price of the mixture, given by Pm

Pm =

= (See Example 2)

This can also represented as:

P2 P1

Pm

Pm-P1 P2-Pm

Examples

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| Example 1 | In a 60 liters mixture of milk and water, the quantity of milk is 5 %. In how much quantity, should milk be added to this mixture so that the quantity of milk in the mixture becomes 15 % ? |
| Solution | Here in this question:  X= 60 liters,         p= 5 %,                 q= 15 %  The quantity of milk to be added  to the mixture to make it 15 % in mixture-                  =60\*{(15-5)/(100-15)                  =60\*(10/85)                  =120/17 liters |

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| Example 2 | Tea worth $126 per kg are mixed with a third variety in the ratio 1: 1 : 2. If the mixture is worth $153 per kg, the price of the third variety per kg will be |
| Solution | |  |  | | --- | --- | | Since first second varieties are mixed in equal proportions, so their average price = **$(126+135/2) = $130.50** | | | So, the mixture is formed by mixing two varieties, one at $ 130.50 per kg and the other at say, $ x per kg in the ratio 2 : 2, i.e., 1 : 1. We have to find x. | | | Cost of 1 kg tea of 1st kind | Cost of 1 kg tea of 2nd kind | | http://www.a2zinterviews.com/Aptitude/alligation-or-mixture/alligation-or-mixture-formula-2.gif | | | http://www.a2zinterviews.com/Aptitude/alligation-or-mixture/therefore.png x-153/22.50 = 1 =› x - 153 = 22.50 =› x=175.50. | | | **Hence, price of the third variety = $175.50 per kg.** | | |