Alligation Medial

Is when the quantities & prices of several things are given to find the mean price of the mixture composed of those materials

Rule

As the whole composition is to the whole value so is any part of the composition to its mean price

Examples

A Tobaconist mixed 36 lb of Tobacco at 1s 2d per lb 12 lb at 2s a pound with 12 lb at 1s 10d per lb what is the price of a pound of this mixture

36 × 1" 2 — 648
12 × 2" 0 — 288
12 × 1" 10 — 264
60 — 1200 — lb 1
60 | 1200 | 12/20 | 1" 8 dns
120
0

A Wine merchant mixed 15 gal of wine at 4s 2d per gallon with 24 gal at 6s 8d & 20 gallons at 6s 3d what is a gallon of this composition worth

15" 4" 2 — 750
24" 6" 8 — 1920
20" 6" 3 — 1500
59 — 4170 — Gal 1
59 | 4170 | 12/70 | 5" 10
413
40
4
160 | 2 41/59
118
42
59

A grocer hath several sorts of sugar viz one sort at 8 dols per cwt another sort at 9 dols per cwt a third sort at 10 dols per cwt & a fourth sort at 12 dols per cwt & he would mix an equal quantity of each together I demand the price of 3½ cwt of this mixture

1 — 8
1 — 9
1 — 10
1 — 12 — Cwt
4 — 39 — 3½
3½
1930
117
4 | 13650
3412.5

A Goldsmith melted together 5 lb of silver bullion of 8 oz fine 10 lb of 7 oz fine & 13 lb of 6 oz fine pray what is the quantity or fineness of this compo

lb oz oz
5" 8 — 40
10" 7 — 70
15" 6 — 90
30 — 200 | 6
180
20
20
400 | 13
30
100
90
10
24
40
20
240 | 8
240

Alligation Alternate

Is the method of finding what quantity of each of the ingrediants whose rates are given will compose a mixture of a given rate so that it is the reverse of alligation medial & may be proved by it

Case 1

When the mean rate of the whole mixture & the rates of all the ingredients ar given without any limited quantity

Examples

A grocer would mix the following quantities of sugar viz at 10cts 13cts & 16cts per lb what quantity of each sort must be taken to make a mixture worth 12 cts per pound

12 {10, 13, 16} — 1.4 — 5, 2, 2

It is required to mix several sorts of viz at 5s 7s & 9s per gallon with water ... gallon together so that the mixture may be worth 6s per gallon how much of each sort must the mixture consists of

6 {5, 7, 9, 0} — 1, 1, 6, 3
6 {5, 7, 9, 0} — 3, 6, 1, 1

Alternation Partial

Case 2

Or when one of the ingredients is limited to a certin quantity thence to find the several quantities of the rest in proportion to the quantity given

Examples

A farmer would mix 20 bushels of rye at 65 cts per bushel with barly at 51 cts & oats at 30 cts per bushel how much barly & oats must be mixed with the 20 bushels of rye that the provender may be worth 41 cts per bushels

41 {65, 51, 30} — 11, 11, 24 — 10 — 34

11 : : 20 : : 11
11
11 | 220
20

11 : : 20 : : 34
20
11 | 680
61 9/11

With 95 gallons of rum at 8s per gallon I mixed other rum a 6s 8d per gallon & some water then I found it stood me in 6s ... per gallon I demand how much rum & how much water I took

76 {96, 80, 0} — 76, 76, 20" 4 — 24

76 : : 95 : : 76
76
570
665
76 | 7220 | 95
684
380
380

76 : : 95 : : 24
24
380
190
76 | 2280 | 30
228
0