Alternation Partial

Case 2

How much water at 0 per gallon must be mixed with wine at 90 cts per gal so as to fill a vessel of 100 gals which may be afforded at 60 cts per gallon

60 { 0 / 90 } 30 / 60 / 90

90 :: 100 :: 60

90 | 6000 (66 2/3
540
600
540
30 | 60 (2
90 3

90 — 100 — 30

30

90 | 3000 (33 1/3
270
300
270
30 | 30 1/
90 3

Brandy at 3-6 + 3s 9d per gallon is to be mixed so that a hhd of 63 gal may be sold for 12s 12s how many gallons must be taken of each

48 { 6 9 / 4 2 } 6 / 31

27

63 :: 12 - 12 :: 9

63 | 252 (4
252
20
48

27 :: 63 :: 6

6

27 | 378 (14
27
108
108

27 :: 63 :: 21

21
63
126

27 | 1323 (49
108
243
243

Arithmetical Progression

Any rank of numbers more than two increasing by common excess or decreasing by common difference is said to be in Arithmetical Progression

Rule

Multiply the sum of the extremes by the number of terms & half the product will be the answer

Examples

Suppose 144 oranges were laid 3 yds distant from each other in a right line & a basket placed two yds from the first orang what length of ground will that boy travel over who gathers them up singly returning with them one by one to the basket

144
143
144
880
880
143
2 | 20880
10440
4
1760 | 41760 (23
3520
6560
5280
220 | 1280 (3
1100
180

40
31
20
200
220

8
40
320
32
160
160
1760

Problem 2

Rule Divide the difference of the extreams by the number of terms less 1 and the quotien will be the common difference

Examples

A debt is to be discharged at 16 different payments in arithmetical progression the first payment is to be 14 the last 100. What is the common difference & the sum of the whole debt

100
14
15 | 86 (5
75
11
20
220 (14
15
70
60
10
12
120 (3
120

100
14
114
16
684
114
2 | 1824
912

Geometrical Progression

Is when any rank or series of numbers increased by one common multiplier or decreased by one common divisor as 1.2.4.8.16 increase by the multiplier 2 and 7.9.3.1 decrease by the divisor 3

Examples

A rich miser thought 30 guineas a price too much for 12 fine horses he agreed to give 4 cts for the first horse 16 cts for the second & 64 for the third horse & so on in triple or fourfold proportion to the last what did they come to at that rate & how much did they cost per head one with

1 2 3 4 5
4 16 64 256 1024
256
1440
81
2023
262144
64
1048576
1572864
16777216
4
67108864
4
3 | 67108864
12 | 22369621 (0
18641.33