

Algebra

ax^2+bx+c sum roots: $-b/a$
 $\Delta = b^2-4ac$ product roots: c/a

Ratios

$q1 : q2 = q2\text{-final} : q1\text{-final}$
 num < denom so fraction < 1 so $(x+1)/(y+1) > x/y$
 num > denom so fraction > 1 so $(x+1)/(y+1) < x/y$

from exercise: $a-10 + b-20 + c-15 = 11k + 18k + 24k$ so $1105-45=53k$ (ratios gains)

efficacy = $1/t$ (inverse proportionality)

$1/t1 : 1/t2 : 1/t3$

take LCM = k so you have $k/t1 : k/t2 : k/t3$

compute to get $x : y : z$ form

then do $x + y + z$ and cross product

Rate of interest = $\text{interest per year} / \text{principal invested} * 100$

When compared, use compared amount as the base

so you have $\Delta / \text{base} * 100$

Use quantity as unit of q , the percentage change is

$\Delta = \text{increased or decrease quantity} / \Delta 1 (\text{original amount}) * 100$

To make a profit, take initial price and add the desired profit so that: **new price per unit = initial (1+profit)**

Always find a 100 that makes the calculation easy = if it's not marked price it's cost price etc.

On Y1, simple and compound interests are the same

Find interest rate w/ difference and interest on interest

Interest = principal * rate * time

Ratios (cont)

discount of marked price = discount / marked price * 100

Usually, these questions include:

- ratios of shared amounts,
 - time to perform a task,
 - investments and interests
 - price increases or decreases
- => FOR PROFITS

Number properties

remainder of sum = sum of remainders

remainder of product = product of remainders

nb of trailing zeros = at least nb of 5s

number of factors = product of each power + 1 [ex: $120 \rightarrow 2^3 * 5^1 * 3^1 \rightarrow (1+1)*(1+1)*(3+1) = 16$]

from exercise: If remainder of product to find, can work by pairs

If two expressions are equal, the exponents must be equal (if $2^{n+2m} = 2^{3m-1}$ then $n+2m = 3m-1$)

AP Sum of arithmetic progression = $(1st + Last / 2) * \text{nb of terms}$

AP nth term $\rightarrow an = a1 + (n-1) * d$ (common divisor)

AP sum of the n first terms : $n/2 [2a1 + (n-1)d]$

GP sum of first n terms = $a(r^n-1) / r-1$ where r is common ratio

Number of ways of selecting two distinct integers from the set of first 100 positive integers = $100C2$ ways.
 i.e., $100C2 = 100 * 99 / 2$

Sets

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$P(A \cup B \cup C) = P(A) + P(B) + P(C) + P(A \cap B \cap C) - [P(A \cap B) + P(A \cap C) + P(B \cap C)]$

Statistics and Average

Standard deviation = mean \rightarrow (number-mean)² \rightarrow mean \rightarrow square root(mean)

From video

⚡ Work and Rate ⚡

$R=J/T$

machines identiques: $nR=J/T$

Geometry / Coordinate Geometry

air triangle = $1/2 * \text{products of sides} * \sin(\text{inside angle})$

$\sin 150^\circ = 1/2$

sum of interior angles of polygon = $(n-2)*180$

Pythagorean triplets (c is odd, at least 2 prime numbers, 1 even number): (3,4,5) / (5,12,13) / (7,24,25) / (8,15,17) / (9,40,41) / (11,60,61) / (12,35,37)

area triangle = r (inserted circle) * semi-perimeter triangle

equation of a circle center (a,b): $(x-a)^2 + (y-b)^2 = r^2$

equation of a line that crosses two intercepts: $x/\text{value } x + y/\text{value } y = 1$ so (value x) + (value y)x = (value x)(value y)



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