Quantitative Aptitude Formulas & Shortcut Tricks for IBPS PO Prelims 2015

Percentage

Percent is derived from a phrase in latin "per centum" which means per hundred. It is a ratio with base (denominator) 100. It evolved as a concept so that there can be a uniform platform for comparing different values.

To express x% as a fraction, divide it by 100 ⇒ **x% = x/100**

To express a fraction as %, multiply it by 100 ⇒ x/**y = [(x/y) × 100] %**

x% of y is given by (y × x/100)

Point to remember for faster Calculation

1 = 100%

1 /2= 50%

1 /3= 33.33%

1/4 = 25%

1/5 = 20%

1 /6= 16.66%

1/7 = 14.28%

1/8 = 12.5%

1/9 = 11.11%

1/10 = 10%

1/11 = 9.09%

1/12 = 8.33%

Shortcuts

If X's income is a% more than Y's income, the Y's income is less than X's income by

[a / (100+a)] * 100%

If 'M' is x% of 'N' and 'P' is y% of 'N' then

'M' is **(x/y) * 100%** of 'P'.

If the sides of the triangle, rectangle, square, circle, rhombus etc is

(i) Increased by a%. Its area is increased by

$2a+(a^2/100)$

(ii)If decreased b%. Its areas is decreased by,

$-2b+(b^2/100)$

The population of a town is 'P'. It increased by x% during 1^{st} year, increased by y% during 2^{nd} year and again increased by z% during 3^{rd} year. The population after 3 years will be,

P *[(100+x)/100] * [(100+y)/100] * [(100+z)/100]

mockbank

SIMPLE AND COMPOUND INTEREST

Principal: - The money borrowed or lent out for certain period is called the principal or the Sum.

Interest: - Extra money paid for using other money is called interest

The cost of borrowing money is defined as Simple Interest. It is of two types – simple interest or compound interest. Simple interest(SI) is calculated only on the principal (P) whereas Compound interest(CI) is calculated on the principal and also on the accumulated interest of previous periods i.e. “interest on interest.” This compounding effect makes a big difference in the amount of interest payable on the principal.

Simple interest is:

Simple Interest = Principal x Interest Rate x Term of the loan(Time of Loan)

SI = P x i x n/100 when interest rate is taken in percent.

Compound Interest

$CI = P [(1 + i)^n – 1]$

where P = Principal, i = annual interest rate in percentage terms, and n = number of compounding periods.

Compounding periods : When calculating compound interest, the number of compounding periods makes a significant difference. The basic rule is that the higher the number of compounding periods, the greater the amount of compound interest. So for every INR 100 principal over a certain period of time, the amount of interest accrued at 10% annually will be lower than interest accrued at 5% semi-annually, which will in turn be lower than interest accrued at 2.5% quarterly.

In the formula for calculating compound interest, the variables “i” and “n” have to be adjusted if the number of compounding periods is more than once a year. That is, “i” has to be divided by the number of compounding periods per year, and “n” has to be multiplied by the number of compounding periods. Therefore, for a 10-year loan at 10%, where interest is compounded semi-annually (number of compounding periods = 2), i = 5% (i.e. 10% / 2) and n = 20 (i.e.10 x 2).

The following table demonstrates the difference that the number of compounding periods can make over time for a INR 10,000 loan taken for a 10-year period.

Shortcut Trick: Rule of 72

The Rule of 72 calculates the approximate time over which an investment will double at a given rate of return or interest “i”, and is given by (72 / i). It can only be used for annual compounding.

For example, an investment that has a 6% annual rate of return will double in 12 years.

An investment with an 9% rate of return will double in 8 years.

PROFIT & LOSS

Cost Price-The price at which an article is purchased is known as cost price (C.P.)

Selling Price-The price at which the article is sold is known as selling price (S.P.)

These questions deals with Selling Price(P), And Cost price(CP). When selling price is greater than cost price then profit And when cost price is greater than selling price then loss.

Profit = SP-CP (SP>CP)
Loss = CP-SP (CP>SP)

Profit and loss questions are very easy to solve. Following formulae should be kept in mind while solving profit loss questions in bank exams.

Profit % = (Profit x 100)/CP

CP= {100 /(100+profit%)} x SP

CP={100/(100-loss%)} x SP

If there is a Profit of x% and loss of y % in a transaction, then the resultant profit or loss% is given by

[x – y - (x × y/100)]

Note- For profit use sign + in previous formula and for loss use – sign.

if resultant is positive then overall its profit. However, if it is negative then overall we have a loss.

If a cost price of m articles is equal to the selling Price of n articles,

(**C.P of m article = S.P. of n article**) then Profit percentage

(m - n)/n×100%

If m parts are sold at x% profit , n parts are sold at y % profit and p parts are sold at z% profit Rs. 'R' are earned as overall profit then the value of total consignment

R ×100 / (mx +ny +pz)

A man purchases a certain no. of article at m rupee and the same no. at n a rupee. He mixes them together and sells them at p a rupee then his gain or loss

[{2mn/(m+n)p} -1]× 100

Marked price = Cost price + Markup

Always Remember: Markup is extra price on Cost Price. So, Markup is always calculated on CP

And

%Markup = [Markup/CP]*100

Discount (if SP < MP) = MP - SP i.e. **SP = MP - Discount**

Always Remember: Discount is deducted from Marked Price. So, Discount is always calculated on MP and

%Discount = [Discount/MP]*100

AVERAGES

Suppose there are N numbers, then their average is their sum divided by that is,

Average=(sum / N)

Weighted Average: The average between two sets of numbers is closer to the set with more numbers.
if 3 batsmen scored 25 runs and 2 batsmen scored 35 runs the average of the team won't be 30. Rather it will be
= (25×3 + 35×2)/5 = 29 . This is nearer to 25 since more batsmen scored 25 runs.

Average =total of data/No. of data

If the value of each item is increase by x, then the average of the group will also increase by x.

If the value of each item is decreased by y, then the average of the group of items will also decrease by y.

If the value of each item is multiplied by the same value m, then the average of the group or items will also get multiplied by m.

If the value of each item is multiplied by the same value n, then the average of the group or items will also get divided by n.

If we know only the average of the two groups individually, we cannot find out the average of the combined group of items.

Average of x natural no's = (x+1)/2

Average of even No's = (x+1)

Average of odd No's = x

Change in the value of a Quantity and its effect on the Average

When one/more than one quantity are **removed** but **replaced** with same no. of quantities of different value,

Change in the no. of quantities and its effect on Average

+ = if quantities are Added, - = if quantities are removed

RATIO AND PROPORTION

Ratio is a fraction of two values. It can be represented in any of the following ways:

=> x/y, x : y , x÷y

- In ratio of the form x : y, x is called as the antecedent/first term and y is the consequent/second term.
- Generally, ratio is a handy way to compare two terms.
- For example : 4 / π > 1 , it is clear that 4 > π
- One thing that has to be remembered while comparing two numbers in a ratio is that they should be represented in same units. For example, if x is in meters and y in litres they cannot be compared by using ratio as they are expressed in different units – meters vs litres.

A proportion is the equality of two ratios/ fractions.

- If x : y = a : b, it can be written as x : y :: a : b and it is said that x, y, a, b are in proportion.
- Here x and b are called extremes, while y and a are called mean terms.
- Product of means=Product of extremes
  Thus,
  x :y :: a : b => (y* a)=(x* b)
- If x : y=a : b

b is called the fourth proportional to x, y and a.

a is called the third proportional to x and y.

- Sub-duplicate: Sub-duplicate ratio of (a:b) is (a^1/2: b^1/2)
- Duplicate ratio of (a:b) is (a^2:b^2)
- Triplicate Ratio:Triplicate ratio of (a:b) is (a^3:b^3)
- Sub-triplicate Ratio: Sub-triplicate ratio of (a:b) is (a^1/3:b^1/3)

- If a/b=c/d then, a+b/a−b=c+d/c−d This is known as Componendo and Dividendo.
- We say that x is directly proportional to y, if x=ky for some constant k and we write, x∝y
- We say that x is inversely proportional to y, if xy=k for some constant k and we write, x∝1y

Ages

Problems on Ages are asked in majority of bank and competitive examinations.

They are generally simple to attempt if you have done practice and remember the formulae. Important formulae to remember are :

1. If the current age isx, thenn times the age is nx.
2. If the current age isx, then agen years later/hence = x + n.
3. If the current age isx, then agen years ago = x − n.
4. The ages in a ratioa: b will be ax and bx.
5. If current age is x, then 1/n of the age is x/n.