# APTITUDE FORMULA DOWNLOADS

**TIME AND DISTANCE -> IMPORTANT FACTS AND FORMULAE**

1. Speed = [Distance/Time],

Time=[Distance/Speed],

Distance = (Speed*Time)

2. x km/hr = [x*5/18] m/sec.

3. If the ratio of the speeds of A and B is a:b, then the ratio of the times taken by them to cover the same distance is 1/a : 1/b or b:a.

4. x m/sec = [x*18/5] km/hr.

5. Suppose a man covers a certain distance at x km/hr and an equal distance at y km/hr. then, the average speed during the whole journey is [2xy/x+y] km/hr.

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**PROFIT AND LOSS -> IMPORTANT FACTS AND FORMULAE**

Cost Price : The price at which an article is purchased, is called its cost price, abbreviated as C.P.

Selling Price : The price at which an article is purchased, is called its cost price, abbreviated as C.P.

Profit or Gain : The price at which an article is purchased, is called its cost price, abbreviated as C.P.

Loss : If S.Pis less than C.P., the seller is said to have incurred a loss.

1. Gain = (S.P.) - (C.P.)

2. Loss or gain is always reckoned on C.P.

3. gain% = [Gain*100/C.P.]

4. Loss = (C.P.) - (S.P.)

5. Loss% = [Loss*100/C.P.]

6. S.P. = (100+Gain%)/100 * C.P.

7. S.P. = (100-Loss%)/100 * C.P.

8. C.P. = 100/(100+Gain%) * S.P.

9. C.P. = 100/(100-Loss%) * S.P.

10. If an article is sold at a gain of say, 35%, then S.P. = 135% of

C.P.

11. If an article is sold at a loss of say, 35%, then S.P. = 65% of C.P.

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**VOLUME AND SURFACE AREA -> IMPORTANT FACTS AND FORMULAE**

I. CUBIOD

Let length = l, breadth = b and height = h units. Then,

1. Volume = (l x b x h) cubic units.

2. Surface area = 2 (lb + bh + lh)

II. CUBE

Let each edge of a cube be of length a. Then, 1. Volume = $a^3$ cubic units.

2. Surface area = $6a^2$ sq. units.

3. Diagonal = √3 a units.

III. CYLINDER

Let radius of base = r and Height (or length) = h Then,

1. Volume = ($\pi r^2 h$) cubic units.

2. Curved surface area = ($2\pi rh$) sq. units.

3. Total surface area = ($2\pi rh + 2\pi r^2$ sq. units)

= $2\pi r (h + r)$ sq. units.

IV. CONE

Let radius of base = r and Height = h. Then,

1. Slant height, l = $\sqrt{h^2 + r^2}$ units.

2. Volume = [1/3 $\pi r^2 h$] cubic units.

3. Total surface area = ($\pi rl + \pi r^2$) sq.units.

V. SPHERE

Let the radius of the sphere be r. Then,

1. Volume = [4/3 $\pi$r3] cubic units.

2. Surface area = ($4\pi r^2$) sq. units.

VI. HEMISPHERE

Let the radius of a hemisphere be r. Then,

1. Volume = [2/3 $\pi$r3] cubic units.

2. Curved surface area = ($3\pi r^2$) sq. units.

3. Total surface area = ($3\pi r^2$) sq. units.

Remember : 1 litre = 1000 $cm^3$.

**BOATS AND STREAMS -> IMPORTANT FACTS AND FORMULAE**

I. In water, the direction along the stream is called downstream. And, the direction against the stream is called upstream.

II. If the speed of a boat in still water is u km/ht and the speed of the stream is v km/hr, then :

Speed downstream = (u + v) km/hr

Speed upstream (u - v) km/hr.

III. If the speed downstream is a km/hr and the speed upstream is b km/hr, then :

Speed in strill water = 1/2 (a + b) km/hr

Rate of stream = 1/2 (a - b) km/hr

**PARTNERSHIP -> IMPORTANT FACTS AND FORMULAE**

I. Partnership : When two or more than two persons run a business jointly, they are called partners and the deal is known as partnership.

II. Ratio of Division of Gains :

(i) When investments of all the partners are for the same time, the gain or loss is distributed among the partners in the ratio of their investments.

Suppose A and B invest Rs. x and Rs. y respectively for a year in a business, then at the end of the year :

(A's share of profit) : (B's share of profit) = x : y.

(ii) When investments are for different time periods, then equivalent capitals are calculated for a unit of time by taking (capital * number of units of time). Now, gain or loss is divided in the ratio of these capitals.

Suppose A invests Rs. x for p months and B invests Rs. y for q months, then (A's share of profit) : (B's share of profit) = xp : yq.

III. Working and Sleeping Partners : A partner who manages the business is known as working partner and the one who simply invests the money is a sleeping partner.

**BANKERS DISCOUNT -> IMPORTANT CONCEPTS**

Bankers' Discount : Suppose a merchant A buys googds worth, say Rs. 10,000 from another merchant B at a credit of say 5 months. Then, B prepares a bill, called the bill of exchange. A signs this bill and allows B to withdraw the amount from his bank account after exactly 5 months.

The date exactly after 5 months is called nominally due date. Three days (known as grace days) are added to it to get a date, known as legally due date.

Suppose B wants to have the money before the legally due date. Then he can have the money from the banker or a broker, who deducts S.I. on the face value (i.e., Rs. 10,000 in this case) for the period from the date on which the bill was discounted (i.e., paid by the banker) and the legally due date. This amount is known as Banker's Dicount (B.D.)

Thus, B.D. is the S.I. on the face value for the period from the date on which the bill was discounted and the legally due date.

Banker's Gain (B.G.) = (B.D.) - (T.D.) for the unexpired time.

Note : When the date of the bill is not given, grace days are not to be added.

**BANKERS DISCOUNT -> IMPORTANT FORMULAE**

I. B.D. = S.I. on bill for unexpired time.

II. B.G. = (B.D.) - (T.D.) = S.I. on T.D. = $(T.D.)^2$ / R.W.

III. T.D. = $\sqrt{P.W. * B.G.}$

IV. B.D. = [Amount * Rate * Time / 100]

V. T.D. = [Amount * Rate * Time / 100 + (Rate * Time)]

VI. Amount = [B.D. * T.D. / B.D. - T.D.]

VII. T.D. = [B.G. * 100 / Rate * Time]

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**CLOCKS -> IMPORTANT FORMULAE**

The face or dial of a watch is a circle whose circumference is divided into 60 equal parts, called minute spaces.

A clock has two hands, the smaller one is called the hour hand or short hand while the larger one is called the minute hand or long hand.

I. In 60 minutes, the minute hand gains 55 minutes on the hour hand.

II. In every hour, both the hands coincide onece.

III. The hands are in the same straight line when they are coincident or opposite to each other.

IV. When the two hands are at right angles, they are 15 minute spaces apart.

V. When the hands are in opposite directions, they are are 30 minute spaces apart.

VI. Angle traced by hour hand in 12 hrs = 360°.

VII. Angle traced by munute hand in 60 min. = 360°.

Too Fast and Too Slow : If a watch or a clock indicates 8.15, when the correct time is 8, it is said to be 15 minutes too fast.

On the other hand, if it indicates 7.45, when the correct time is 8, it is said to be 15 minutes too slow.

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**TRUE DISCOUNT -> IMPORTANT CONCEPTS**

Suppose a man has to pay Rs. 156 after 4 years and the rate of interest is 14% per annum. Clearly, Rs. 100 at 14% will amount to Rs. 156 in 4 years. So, the payment of Rs. 100 now will clear off the debt of Rs. 156 due 4 years hence. We say that :

Sum due = Rs. 156 due 4 years hence;

Present worth (P.W.) = Rs.100;

True Discount (T.D.) = Rs. (156 - 100) = Rs. 56 = (Sum due) - (P.W.).

We define : T.D. = Interest on P.W.

Amount = (P.W.) + (T.D.).

Interest is reckoned on P.W. and true discount is reckoned on the amount.

**TRUE DISCOUNT -> IMPORTANT FORMULAE**

Let rate = R% per annum and Time = T years. Then,

I. P.W. = 100 * Amount / 100 + (R*T) = 100 * T.D. / R * T

II. T.D. = (P.W.)* R * T / 100 = Amount * R * T / 100 + (R * T)

III. Sum = (S.I.) * (T.D.) / (S.I.) - (T.D.)

IV. (S.I.) - (T.D.) = S.I on T.D.

V. When the sum is put at compound interest, then P.W. = Amount / [1+R/100]T;

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**PROBLEMS ON TRAINS -> IMPORTANT FORMULAE**

1. a km/hr = [a * 5/18]m/s.

2. a m/s = [a * 18/5] km/hr.

3. Time taken by a trian of length l metres to pass a pole or a standing man or a signal post is equal to the time taken by the train to cover l metres.

4. Time taken by a train of length l metres to pass a stationary object of length b metres is the time taken by the train to cover (l + b) metres.

5. Suppose two trains or two bodies are moving in the same direction at u m/s and v m/s, where u>v, then their relatives speed = (u - v) m/s.

6. Suppose two trains or two bodies are moving in opposite directions at u m/s and v m/s, then their relative speed is = (u + v) m/s

7. If two trains of length a metres and b metres are moving in opposite directions at u

8. If two trains of length a metres and b metres are moving in the same direciton at u m/s and v m/s, then the time taken by the faster train to cross the

slower train = (a + b)/(u - v) sec.

9. If tow trains (or bodies) start at the same time from points A and B towards each other and after crossing they take a and b sec in reaching B and A respectively, then

(A's speed) : (B's speed) = (√b : √a).

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**SIMPLE INTEREST -> IMPORTANT FORMULAE**

1. Principal : The money borrowed or lent out for a certain priod is called the principal of he sum.

2. Interest : Extra money paid for using other's money is called interest.

3. Simple Interest (S.I.) : If the interest on a sum borrowed for a certain period is reckoned uniformly, then it is called simple interest.

Let Principal = P, Rate = R% per annum (p.a.) and Time = T years, Then,

(i) S.I. = [P * R * T / 100]

(ii) P = [100 * S.I. / R * T]

R = [100 * S.I / P * T] and T = [100 * S.I. / P * R]

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**PROBLEMS ON NUMBERS -> DESCRIPTION**

In this section, questions involving a set of numbers are put in the form of a puzzle. You have to analyse the given conditions, assume the unknown the numbers and form equations accordingly, which on solving yield the unknown numbers.

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**AVERAGE -> IMPORTANT FACTS AND FORMULAE**

I. Average = [Sum of observations / Number of observations]

II. Suppose a man covers a certain distance at x kmph and an equal distance at y kmph. Then, the average speed during the whole journey is [2xy / x + y] kmph.

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**Numbers -> IMPORTANT FACTS AND FORMULAE**

1. Natural Numbers :

Counting numbers 1, 2, 3, 4, 5, .. are called natural numbers.

II. Whole Numbers :

All counting numbers together with zero form the set of whole numbers. Thus,

I. 0 is the only whole number which is not a natural number.

II. Every natural number is a whole number.

III.Some Important Formulae :

I. ( 1 + 2 + 3 + .....+ n) = n (n + 1 ) / 2

II. (1 2 + 22 + 32 + ..... + n2) = n ( n + 1 ) (2n + 1) / 6

III. (1 3 + 23 + 33 + ..... + n3) = n2 (n + 1)2 / 4

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SURDS ADN INDICES -> IMPORTANT FACTS AND FORMULAE

1. LAWS OF INDICES :

(i) am * an = am + n

(ii) am / an = am - n

(iii) (am)n = amn

(iv) (ab)n = anbn

(v) (a/b)n = an/ bn

(vi) a0 = 1

2. SURDS : Let a be rational number and n be a positive integer such

that a(1/n) = n√a

3 LAWS OF SURDS :

(i) n√a = a (1/n)

(ii) $\sqrt[n]{ab} = \sqrt[n]{a} \times \sqrt[n]{b}$

(iii) $\sqrt[n]{a/b} = \sqrt[n]{a} / \sqrt[n]{b}$

(iv) $(\sqrt[n]{a})^n = a$