Numerical Ability

TCS Digital Test Preparation Series

About me

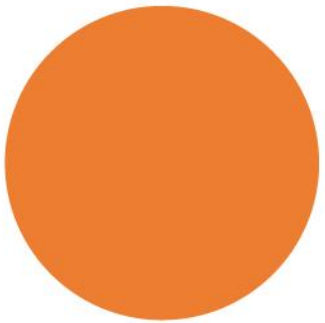
- Name- Sagar Sarkar
- Years of experience- 2.7 Years
- Areas of expertise-Python, Machine Learning and AI.
- TCS Digital Cleared.
- Gold Medalist in Academics in the branch of Mechanical and Automation Engineering in 2019 at Amity University.
- Pursuing B.Sc. in Data Science and Programming from IIT Madras.

Pattern

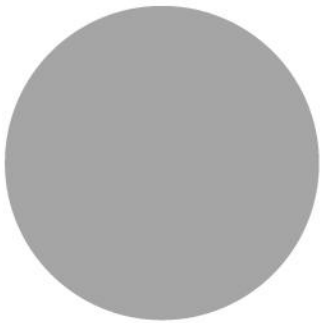
Topic Name	Marks per Item	No of Items	Time
Numerical Ability	1	15	40 mins

- **Negative marking-You must read all instructions carefully. If there is any negative marking, it will be clearly mentioned in the instructions.**
- **For more details, please visit this link - https://www.tcs.com/careers/tcs-off-campus-hiring .**

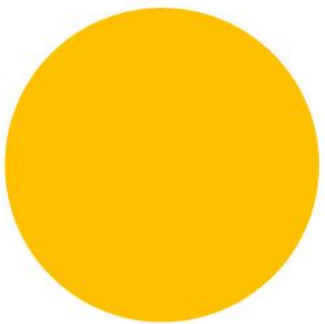
Approach



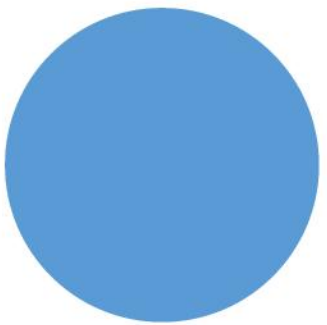
Complete understanding of questions covered during the Session.



Try to attempt practice assignment questions.



Go through the link provided in the resource slide and try to solve them.



Try to attempt questions from the book details of which have been provided in the resources slide.

Problems on Pipes and Cisterns

Formulas

- Say Pipe A can fill a tank in 10 hrs and Pipe B can empty a full tank in 15 hrs. Now assuming the capacity of the tank to be 30 litres, A fills 30/10 = 3 litres in an hour and B drains 30/15 = 2 litres in an hour. The net inflow in the tank after one hour is 3 – 2 = 1 litre. So, the tank will be filled in 30/1 = 30 hrs.
- **INLET:** An inlet is a pipe which is connected to the tank and with the help of this pipe, the tank is filled.
- **OUTLET/LEAK:** An outlet is a pipe which is connected to the tank. This pipe drains out water from the tank and the tank gets emptied if this pipe is opened.
- If a pipe can fill a tank in a hrs, then the part filled in 1 hr =1/a.
- If a pipe can empty a tank in b hrs, then the part of the full tank emptied in 1 hr = 1/b.
- If a pipe can fill a tank in a hrs and the another pipe can empty the full tank in b hrs, then the net part filled in 1 hr, when both the pipes are opened =[1/a - 1/b] ∴ Time taken to fill the tank, when both the pipes are opened = ab/(b - a)
- If a pipe can fill a tank in a hrs and another can fill the same tank in b hrs, then the net part filled in 1 hr, when both pipes are opened = [1/a + 1/b] ∴ Time taken to fill the tank = ab/(a + b)
- If a pipe fills a tank in a hrs and another fills the same tank in b hrs, but a third one empties the full tank in c hrs, and all of them are opened together, the net part filled in 1 hr = [1/a+ 1/b-1/c] ∴ Time taken to fill the tank =abc/(bc + ac – ab) hrs.
- A pipe can fill a tank in a hrs. Due to a leak in the bottom it is filled in b hrs. If the tank is full, the time taken by the leak to empty the tank = ab/(b - a) hrs.

Formulas

In this case, the filling rate or capacity of the pipes and given and then question asks about the time it will take to fill a tank or about the capacity of the tank. There are two ways to deal with the questions on time and work, let us discuss those one by one.

Approach One:

If a pipe fills a tank in A minutes and another pipe fills the same tank in B minutes. Then in how much time the tank will be filled completely?

(1/A) + (1/B) = (1/C), where C is the time in which tank will be filled, (in minutes). These have been added because both the pipes are filling the tank.

If a pipe fills a tank in A minutes and another pipe empties the same full tank in B minutes. Then in how much time the tank will be filled completely, if both the pipes are opened simultaneously?

(1/A) - (1/B) = (1/C), where C is the time in which tank will be filled (in minutes). It is subtracted because the second pipe is a drain pipe and it reduces the work done by the first pipe.

Illustration 1: If a pipe fills a tank in 20 minutes and a pipe empties the same tank in 60 minutes. Then in how much time the tank will be filled completely if both the pipes are opened together?

Sol: Let the tank be filled in X minutes.

By unitary method,

(1/20) - (1/60) = (1/X).

Solving the equation, we get, x = 30 minutes. So, the tank will be filled in 30 minutes.

Formulas

Approach Two (LCM Method):

Let the capacity of the tank = 60 units (or say 60 litres),

LCM = (20,60) = 60.

Rate of the filling pipe = 60/20

⇒ 3 litres per minute

Rate of the draining pipe = 60/60

⇒ 1 litre per minute

In one minute (3 – 1) = 2 litres of water is collected in the tank

Thus, 60 litres of water will be filled in 60/2 = 30 minutes.

Illustration 2: Two pipes fill a tank in 20 minutes and 60 minutes. A third pipe empties the same tank in 40 minutes. In how much time will the tank be filled if all three pipes are opened together?

Sol: Let the tank is filled in X minutes. By unitary method,

(1/20)+(1/60)-(1/40)=(1/X).

Solving, we get x = 24 minutes. Hence, the tank will be filled in 24 minutes.

Formulas

By LCM method:

Let the capacity of the tank = 120 units (or say 120 litres),

LCM = (20, 60, 40) = 120

Rate of the first filling pipe = 120/20

⇒ 6 litres per minute

Rate of the second filling pipe = 120/60

⇒ 2 litre per minute

Rate of the draining pipe = 120/40

⇒3 litre per minute

Now in a minute, (6 + 2 – 3) = 5 litre of water is filled in the tank

Hence, 120 litres of water will be collected in 120/5 = 24 minutes.

Formulas

Illustration 3:

A pipe can fill a cistern in 12 minutes and another can fill it in 15 minutes, but a third pipe can empty it in 6 minutes. The first two are kept open for 6 minutes in the beginning and then the third pipe is also opened, in what time will the cistern be emptied?

Solution:

Let the capacity of the tank = LCM of (12,15, 6) = 60 litres.

Rate of work done by the first pipe = 60/12

⇒ 5 L/min

Rate of work done by the second pipe = 60/15

⇒ 4L/min

Rate of work done by the draining pipe = 60/6

⇒10L/min

If all the pipes are opened simultaneously, (5+4-10) litres will be filled in a minute.

Since this comes out to be negative, no water will be filled at any point of time.

For the 6 minutes only filling pipes are opened,

Rate of both filling pipes = 9L/min, (5+4).

So in 6 minutes, 9 × 6 = 54 litres water is filled.

When the third pipe is opened, all three pipes will work simultaneously, at a rate of (5+4 – 10) = -1 ltr per min. This implies that in a minute, 1 litre water will be drained.

So, 54 litres water will be drained in 54 minutes. So the tank will be emptied in 54 minutes.

Sample Question 1

Pipe M and N running together can fill a cistern in 6 minutes. If M takes 5 minutes less than N to fill the cistern, then the time in which N alone can fill the cistern will be

a) 15 min

b) 10 min

c) 30 min

d) 25 min

Sample Question Solution 1

Sol : Option A

Explanation: Let pipe M fills the cistern in x minutes.

Therefore, pipe N will fill the cistern in (x+5) minutes.

Now, $1/x + 1/(x+5) = 1/6 \rightarrow x = 10$

Thus, the pipe M can fill in 10 minutes, so N can fill in 10+5 =15 minutes.

Sample Question 2

Two pipes can fill a tank in 12 and 20 hours respectively. The pipes are opened simultaneously and it is found that due to leakage in the bottom, 30 minutes extra are taken for the cistern to be filled up. If the cistern is full, in what time would the leak empty it?

a) 120 hrs

b) 100 hrs

c) 115 hrs

d) 112 hrs

Sample Question Solution 2

Sol : Option A

Explanation: Cistern filled by both pipes in one hour = 1/12+1/20=2/15th

Therefore both pipes filled the cistern in 15/2hrs.

Now, due to leakage both pipes filled the cistern in 15/2+30/60=8hrs.

Therefore Due to leakage, filled part in one hour = 1/8

Therefore part of cistern emptied, due to leakage in one hour = 2/15-1/8= 1/120th

∴ In 120 hrs, the leak would empty the cistern.

Sample Question 3

Two pipes A and B can fill a tank in 20 and 16 hours respectively. Pipe B alone is kept open for 1/4 of time and both pipes are kept open for remaining time. In how many hours, the tank will be full?

a) 18 1/3 hrs

b) 20 hrs

c) 10 hrs

d) 12 1/4 hrs

Sample Question Solution 3

Sol : Option C

Explanation: Let the required time be x hours, then $\frac{1}{16}\left(\frac{1}{4}x\right)+\frac{1}{16}\left(x-\frac{1}{4}x\right)+\frac{1}{20}\left(x-\frac{1}{4}x\right)=1$

$\Rightarrow$ x/16+3x/80 = 1$\Rightarrow$ x= 11=10 hours.

Sample Question 4

A cistern normally takes 10 hours to be filled by a tap but because of one open outlet pipe, it takes 5 hours more. In how many hours will the outlet pipe will empty a full cistern?

a) 20 hours

b) 24 hours

c) 30 hours

d) None of these

Sample Question Solution 4

Sol : Option C

Explanation: As cistern is filled in 10 hours, therefore in 1 hour, filled part → 1/10th

Now, due to outlet pipe, filled part in 1 hour = 1/15th

Part of the cistern emptied, due to leakage in 1 hour = 1/10 - 1/15 = 1/30th

Therefore the leak will empty the full cistern in 30 hrs.

Time and Work

Formulas

- The basic formula for solving is: $1/r + 1/s = 1/h$
- Let us take a case, say a person Hrithik
- Let us say that in 1 day Hrithik will do $1/20^{th}$ of the work and 1 day Dhoni will do $1/30^{th}$ of the work. Now if they are working together they will be doing $1/20 + 1/30 = 5/60 = 1/12^{th}$ of the work in 1 day. Now try to analyze, if two persons are doing $1/12^{th}$ of the work on first day, they will do $1/12^{th}$ of the work on second day, $1/12^{th}$ of the work on third day and so on. Now adding all that when they would have worked for 12 days $12/12 = 1$ i.e. the whole work would have been over. Thus the concept works in direct as well as in reverse condition.
- The conclusion of the concept is if a person does a work in 'r' days, then in 1 day- $1/r^{th}$ of the work is done and if $1/s^{th}$ of the work is done in 1 day, then the work will be finished in 's' days. Thus working together both can finish $1/h$ ($1/r + 1/s = 1/h$) work in 1 day & this complete the task in 'h' hours.
- The same can also be interpreted in another manner i.e. If one person does a piece of work in x days and another person does it in y days. Then together they can finish that work in $xy/(x+y)$ days
- In case of three persons taking x, y and z days respectively, They can finish the work together in $xyz/(xy + yz + xz)$ days

Formulas

- Another important concept that is used in time work problems is the combined efficiency of two or more persons. In questions on time and work, the rates at which certain persons or machines work alone are usually given, and it is necessary to compute the rate at which they work together (or vice versa).
- Let us say, for example, it takes 3 & 6 hours for Bahubali and Kattappa, respectively, to break a dam working alone. So, in 1 hour Bahubali would have broken one-third or 1/3rd or 33 1/3% of the dam and Kattappa would have broken one-sixth or 1/6th or 16 2/3% of the dam. In 2 hours, Bahubali would have destroyed 1/3*2 or 33 1/3%= 66 2/3% of the dam and kattappa would have destroyed 1/6th *2= 1/3= 33 1/3% of the dam.
- So if Both Bahubali and Kattappa work together, they would have destroyed 66 2/3+ 33 1/3 (2/3+1/3) or 100% of the dam in 2 hours. Therefore, if both worked together for 1 hour, they would have destroyed 1/3 + 1/6= ½ or half of the dam. Thus in 2 hours, the dam is destroyed.
- Generalizing, we conclude that in 1 hour, Bahubali does 1/r of the job, Kattappa does 1/s of the job, and Bahubali & Kattappa together do 1/h of the job or that together they can finish the job in 'h' hours where the formula for work comes out as 1/r + 1/s = 1/h.

Formulas

- The same concept can be learned with unit’s work approach as well, which assumes the total work to be done as the LCM (Learn how to calculate LCM) of the number of days taken by each of the persons to complete the work. Let's assume that Trump can do a piece of work in 20 days working alone and Putin can do it in 30 days of his own. Now in the above-mentioned case, let us assume that the work consists of the LCM of 20 & 30 i.e. 60 units to be done by Trump & Putin. Since Trump completes 60 units in 20 days, so he completes 60/20 = 3 units of work per day. Similarly Putin completes 60 units of the work in 30 days, so he completes 60/30 = 2 units per day. They are doing the same work together, so they do 3 + 2 = 5 units per day.
- So, 60 units will be done in 60/5 = 12 days.
- You should go through the following time and work examples in order to understand the concept better. This is one of the favorite areas of the examiner. You will see aptitude questions on time and work in almost all the competitive examinations.

Sample Question 5

Ram is twice as efficient as Sunita and can finish a piece of work in 25 days less than Sunita. Sunita can finish this work in how many days?

a) 45 Days
b) 30 Days
c) 90 Days
d) 25 Days
e) 50 Days

Sample Question Solution 5

Sol : Option E

Explanation: Work Formula: Efficiency of Ramesh: Efficiency of Sunita = 2: 1.

Ram will take 1/2 of time as compared to Sunita.

Say, Sunita takes 2x days and Ram takes x days. $\therefore 2x - x = 25 \Rightarrow x = 25$.

$\therefore$Sunita takes $25 \times 2 = 50$ days to do the work.

Sample Question 6

Mr. Ram has a sum of money, which is sufficient to pay Usha's wages for 30 days and Manika's wages for 60 days. If he employs them together, the money is sufficient to pay their wages for how many days?

a) 12 Days

b) 10 Days

c) 30 Days

d) 20 Days

e) 36 Days

Sample Question Solution 6

Sol : Option D

Explanation: The concept is the same here as the normal time and work problems. Usha's one day's wage bill is 1/30 of the total money. Manika's wage bill is 1/60 of the total money.

That means together their wage bill is 1/30 + 1/60 = 3/60 = 1/20 of the total money. Thus, the money is sufficient for their 20 days' wages.

Sample Question 7

In the beginning, Ram works at a rate such that he can finish a piece of work in 24 hrs, but he only works at this rate for 16 hrs. After that, he works at a rate such that he can do the whole work in 18 hrs. If Ram is to finish this work at a stretch, how many hours will he take to finish this work?

1) 12 hrs
2) 18 hrs
3) 11½ hrs
4) 15 hrs
5) 22 hrs

Sample Question Solution 7

Sol : Option 5

Explanation: Ram's 16 hr work = 16/24 = 2/3. Remaining work = 1 – 2/3 = 1/3.

Using work and time formula: This will be completed in 1/3×18 i.e. 6 hrs.

So, total time taken to complete work = 16 + 6= 22 hrs.

Sample Question 8

A and B can do a piece of work in 40 days, B and C can do it in 120 days. If B alone can do it in 180 days, in how many days will A and C do it together?

1. 45 days
2. 22.5 days
3. 25 days
4. 18 days
5. 12 days

Sample Question Solution 8

Sol : Option 1

Explanation:A + B take 40 days. B alone takes 180 days.

$\therefore$ A will take $1/40 - 1/180 = 7/360 \Rightarrow 360/7$ days.

B + C take 120 days. $\therefore$ C alone will take $1/120 - 1/180 = 1/360$

i.e. 360 days. $\therefore$ A & C together will take $7/360 + 1/360$

$= 8/360 \Rightarrow 360/8 = 45$ days to complete the work.

Mensuration

Formulas

- **Cuboid:** A cuboid is a three-dimensional figure formed by six rectangular surfaces, as shown below. Each rectangular surface is a face. Each solid line segment is edge, and each point at which the edges meet is vertex. A rectangular solid has six faces, twelve edges, and eight vertices. Edges mean sides and vertices mean corners. Opposite faces are parallel rectangles that have same dimensions.
- The surface area of a rectangular solid is equal to the sum of the areas of all the faces.
  Total surface area = $2(lb + bh + hl)$
  Curved surface area = $2h(l + b)$
- Volume = lbh, Where l= length, b= breadth, h= height
- In the rectangular solid, the dimensions are 3, 4, and 8.
- The surface area of the rectangular solid is equal to $2[(3 \times 4) + (3 \times 8) + (4 \times 8)] = 136$.
- The cuboid volume is equal to $3 \times 4 \times 8 = 96$.
- Body diagonal of a cuboid = Length of the longest rod that can be kept inside a rectangular room is =
  $\sqrt{L^2 + B^2 + H^2}$

Formulas

- **Cone:** A cone has one circle on one of its ending & rest is the curved circle part with a corner on the other end.
- Volume = $1/3\ \pi r^2 h$. Surface Area (curved) = $\pi\ r\ l$, where l = slant height.
- As per the Pythagoras theorem, $l^2 = r^2 + h^2$. formula for surface area (total) = $\pi\ r\ l + \pi r^2$.
- **Frustum of a cone:** A frustum is lower part of a cone, containing the base, when it is cut by a plane parallel to the base of the cone. Slant height, L = $\sqrt{h^2 + (R-r)^2}$ Curved Surface area of cone = $\pi(R + r)$ L. Total surface area of a frustum = Base area + Area of upper circle + Area of lateral surface = $\pi (R^2 + r^2 + RL + rL)$. Volume of frustum = $\pi h/3\ (R^2 + r^2 + Rr)$
- **Right Prism:**
- A prism is a solid, whose vertical faces are rectangular and whose bases are parallel polygons of equal area. A prism is said to be triangular prism, pentagonal prism, hexagonal prism, octagonal prism according to number of sides of the polygon that form the base. In a prism with a base of n sides, number of vertices = $2n$, number of faces = $n + 2$.
- Surface area formula of vertical faces of a prism = perimeter of base x height.
- **Total surface area of a prism** = perimeter of base x height + 2 x area of base
- **Volume of a pris**m = area of base x height

Formulas

- **Cylinder:** The figure given below is right circular cylinder. The two bases are circles of the same size with centers A and B, respectively, and altitude (height) AB is perpendicular to the base.
  The surface area of a right circular cylinder with a base of radius 'r' and height 'h' is equal to $\mathbf{2(\pi r^2) + 2\pi rh}$ (the sum of the areas of the two bases plus the area of the curved surface).
  The volume of cylinder is equal to $\mathbf{\pi r^2 h}$, that is (area of base) x (height).
- **Volume of material of a hollow cylinder** = $\pi (R^2 - r^2) h$, where R is outer radius and r is inner radius.
- In the cylinder given below, surface area is equal to $2(36\pi) + 2\pi(6)(9) = 180\pi$, and the volume is equal to $36\pi(9) = 324\pi$.

Sample Question 9

The area of a rectangle is four times of a square. The length of the rectangle is 80 cm and the breadth of the rectangle is 3 times that of the side of the square. What is the side of the square?

1. 40 cm
2. 30 cm
3. 45 cm
4. 60 cm
5. 20 cm

Sample Question Solution 9

Sol : Option 4

L = 80 cm. B = 3a, where a is the side of the square. ∴ Area of rectangle = LB = $4a^2 \Rightarrow 80 \times 3a = 4\ a^2 \Rightarrow a = 60$ cm.

Sample Question 10

The rainwater from a flat roof 16 m long and 10 m wide is collected in a tank whose internal measurements are 2 m long, 2.4 m wide and 3 m deep. Before it started raining it was half-full and after the rain it was full. Find the height of rainfall.

1. 1.8 cm
2. 0.9 cm
3. 0.09 cm
4. 9 cm
5. 4.5 cm

Sample Question Solution 10

Sol : Option 5

Let h be the height of the rainfall = h

$1.6 \times 10 \times h = 1/2(2 \times 2.4 \times 3)$

$h = .045m = 4.5cm$

Sample Question 11

Two small circular parks of diameters 6 m and 8 m are to be replaced by a bigger circular park. What would be the radius of this new park, in meter, if the new park occupies the same space as the two small parks (in meter)?

1. 5
2. 10
3. 15
4. 20
5. 25

Sample Question Solution 11

Sol : Option 1

Area of the new circular park = sum of the areas of the 2 smaller parks

$\Rightarrow \pi (6/2)^2 + \pi (8/2)^2 = \pi(9+ 16) = 25\pi \Rightarrow 25 \pi = \pi R^2. \therefore R^2 = 25 \Rightarrow R = 5$ m

Sample Question 12

An open rectangular tank is made of concrete, the sides and base being 30 cm thick. Internally the tank is 8 m long, 4 m broad and 3 m high. Find its weight in kg, if concrete weighs 1 kg per 1000 cubic centimeter.

1. 34,548 kg
2. 44,416 kg
3. 39,416 kg
4. 40,000 kg.
5. None of these

Sample Question Solution 12

Sol : Option 1
The outer dimensions are 8.6 x 4.6 x 3.3 m.
So volume of the block = 8.6 x 4.6 x 3.3 – 8 x 4 x 3 = 130.548 - 96 = 34.548 cu. m = 34548000 cu cm, weight of the block =34548000/1000 = 34548 kg.

Progression & Series

Formulas

Arithmetic Progression

- An arithmetic progression is a sequence of numbers in which each term is derived from the preceding term by adding or subtracting a fixed number called the common difference "d" For example, the sequence 9, 6, 3, 0,-3, ... is an arithmetic progression with -3 as the common difference. The progression -3, 0, 3, 6, 9 is an Arithmetic Progression (AP) with 3 as the common difference.
- The general form of an Arithmetic Progression is a, a + d, a + 2d, a + 3d and so on. Thus nth term of an AP series is T_n = a + (n - 1) d, where T_n = n^{th} term and a = first term. Here d = common difference = T_n - T_{n-1}.
- Sum of first n terms of an AP: S =(n/2)[2a + (n- 1)d]
- The sum of n terms is also equal to the formulawhere l is the last term.
- T_n = S_n - S_{n-1} , where T_n = n^{th} term
- When three quantities are in AP, the middle one is called as the arithmetic mean of the other two. If a, b and c are three terms in AP then b = (a+c)/2

Formulas

Geometric Progression

- A geometric progression is a sequence in which each term is derived by multiplying or dividing the preceding term by a fixed number called the common ratio. For example, the sequence 4, -2, 1, - 1/2,.... is a Geometric Progression (GP) for which - 1/2 is the common ratio.
- The general form of a GP is a, ar, ar^2, ar^3 and so on.
- The nth term of a GP series is $T_n = ar^{n-1}$, where a = first term and r = common ratio = T_n/T_{n-1}) .
- The formula applied to calculate sum of first n terms of a GP:
- When three quantities are in GP, the middle one is called as the geometric mean of the other two. If a, b and c are three quantities in GP and b is the geometric mean of a and c i.e. b =√ac
- The sum of infinite terms of a GP series $S_\infty = a/(1-r)$ where $0< r<1$.
- If a is the first term, r is the common ratio of a finite G.P. consisting of m terms, then the nth term from the end will be = ar^{m-n}.
- The nth term from the end of the G.P. with the last term l and common ratio r is $l/(r^{(n-1)})$.

Formulas

Harmonic Progression

- A series of terms is known as a HP series when their reciprocals are in arithmetic progression. Example: 1/a, 1/(a+d), 1/(a+2d), and so on are in HP because a, a + d, a + 2d are in AP.
- The n^{th} term of a HP series is $T_n = 1/ [a + (n -1) d]$.
- In order to solve a problem on Harmonic Progression, one should make the corresponding AP series and then solve the problem.
- nth term of H.P. = 1/(nth term of corresponding A.P.)
- If three terms a, b, c are in HP, then b =2ac/(a+c).

Formulas

Some General Series

- Sum of first n natural numbers = $\sum n = \frac{n(n+1)}{2}$
- Sum of squares of first n natural numbers = $\sum n^2 = \frac{n(n+1)(2n+1)}{6}$
- Sum of cubes of first n natural numbers = $\sum n^3 = \left[\frac{n(n+1)}{2}\right]^2$

Relation between Arithmetic Mean and Geometric mean:

- The relation between Arithmetic mean and Geometric mean is very important. A lot of questions are asked based on this relation only.
  Let us check the relation between the two.

- Let x and y are two positive real numbers. Then we have $(x - y)^2 = 0$
  $\Rightarrow x^2 + y^2 - 2xy = 0$

  $\Rightarrow x^2 + y^2 - 2xy + 4xy - 4xy = 0$

  $\Rightarrow x^2 + y^2 + 2xy - 4xy = 0$

  $\Rightarrow x^2 + y^2 + 2xy = 4xy$

  $\Rightarrow (x + y)^2 = 4xy$

  $\Rightarrow x + y \geq 2\sqrt{xy}$

  $\Rightarrow \frac{x+y}{2} \geq \sqrt{xy}$

Sample Question 13

What is the sum of all positive integers up to 1000, which are divisible by 5 and are not divisible by 2?

A. 10,050

B. 5050

C. 5000

D. 50,000

Sample Question Solution 13

Sol : Option D

Explanation: The positive integers, which are exactly divisible by five, are 5, 10, 15, ..., 1000

Out of these 10, 20, 30,,.... 1000 are divisible by two.

Therefore, we will have to find the sum of all the positive integers 5, 15, 25, ..., 995

If n is the no. of terms in it, then sequence is

$995 = 5 + 10(n - 1) \Rightarrow 990 = 10n - 10$

$1000 = 10n$

Thus, $n = 100$.

Thus the sum of arithmetic progression series $= (n/2)(a + l) = (100/2)(5 + 995) = 50000$.

Sample Question 14

In an AP, the ratio of the 2nd term to the 7th term is 1/3. If the 5th term is 11, what is the 15th term?

A. 28

B. 31

C. 33

D. 36

Sample Question Solution 14

Sol : Option B

The 2nd and the 7th terms are (a + d) and (a + 6d) respectively. The ratio of these terms is 1/3. Solving this ratio, we get 2a = 3d. The 5th term is (a + 4d) = 11. Substituting for a, we get a = 3 and d = 2. Therefore, the 15th term is (a + 14d) = 31.

Sample Question 15

The distance travelled (in m) by a ball dropped from a height are 128/9, 32/3, 8, 6... How much distance will it travel before coming to rest ?

A. 464/9

B. 120cm

C. 512/9

D. 256/9

Sample Question Solution 15

Sol : Option C

The total distance travelled by the ball = $\frac{128}{9} + \frac{32}{3} + 8 + 6 + ...$

This is an infinite G.P. with first term as 128/9 and the common difference = 3/4

Hence the required distance = $\frac{a}{1-r} = \frac{\frac{128}{9}}{1-\frac{3}{4}} = \frac{128}{9} \times 4 = \frac{512}{9} m$

Sample Question 16

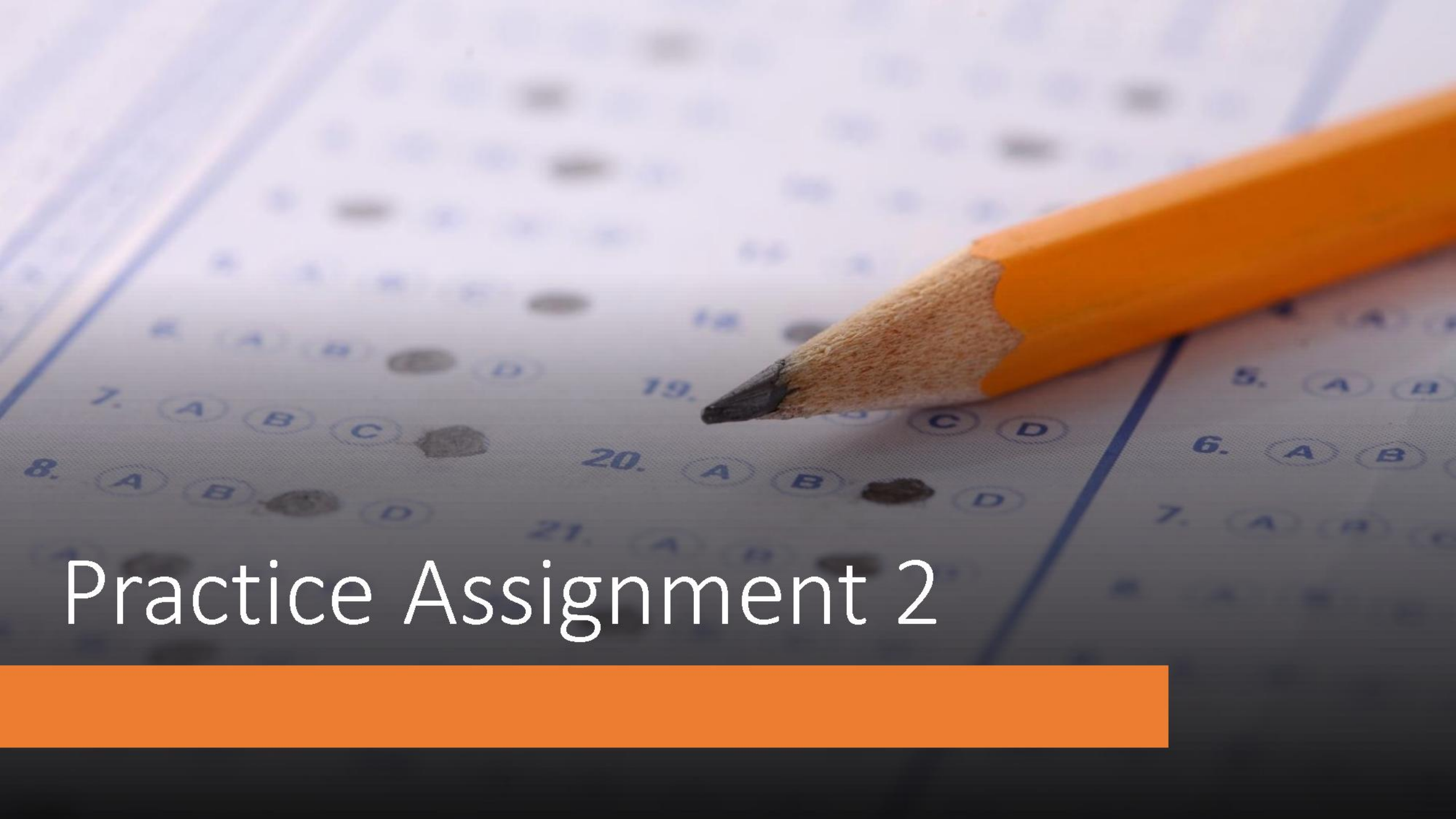
Find the G. M. between 4/9 and 169/9.

Sample Question Solution 16

Sol : Option B

The geometric mean between two terms ‘a’ and ‘b’ are given by $\sqrt{ab}$

Hence the G.M. between 4/9 and 169/9 = $\sqrt{\frac{4}{9} \times \frac{169}{9}} = \sqrt{\frac{676}{81}} = \frac{26}{9}$



Practice Assignment 2

Practice Question 1.1

Two pipes P and Q can fill a cistern in 36 and 48 minutes respectively. Both pipes are opened together, after how many minutes should Q be turned off,so that the cistern be fill in 24 minutes?

a) 6 min

b) 16 min

c) 10 min

d) 12 min

Practice Question Solution 1.1

Sol : Option B

Explanation: P can fill the cistern in 36 minutes,so in 1 min, P can fill the cistern = 1/36th part

In 24 min, P can fill the cistern = 24/36 = 2/3rd. Remaining part = 1- 2/3 = 1/3rd

As Q can fill full cistern in 48 minutes,so it will fill 1/3rd part in 16 minutes.

Practice Question 1.2

Two taps M and N can separately fill a cistern in 30 and 20 minutes respectively. They started to fill a cistern together but tap A is turned off after few minutes and tap B fills the rest part of cistern in 5 minutes. After how many minutes was tap M turned-off?

a) 9 min

b) 10 min

c) 12 mi

d) None of these

Sample Question Solution 1.2

Sol : Option A

Explanation: Let M was turned off after x min. Then, cistern filled by M in x min + cistern

filled by N in (x+5) min = 1 $\Rightarrow$ x/30 + (x+5)/20 = 1 $\Rightarrow$ 5x+15=60 $\Rightarrow$ x = 9 min.

Practice Question 1.3

Three fill pipes A, B and C can fill separately a cistern in 12, 16 and 20 minutes respectively. A was opened first. After 2 minute, B was opened and after 2 minutes from the start of B, C was also opened. Find the time when the cistern will be full after opening of C?

a) 3 21/47 min

b) 4 1/2 min

c) 3 9 15/16 min

d) None of these

Practice Question Solution 1.3

Sol : Option A

Explanation: Let cistern will be full in x min. Then part filled by A in x min + part filled by

B in (x-2) min + part filled by C in (x-4) min = 1

$\Rightarrow x/12 + (x-2)/16 + (x-4)/20 = 1 \Rightarrow 47x - 78 = 240 \Rightarrow x = 162/47 = 321/47$ min

Practice Question 1.4

A cistern filled in 20 hours by three pipes A, B and C. The pipe C is twice as fast as B and B is thrice as fast as A. How much time will pipe A alone take to fill the tank?

a) 200 hrs

b) 205 hrs

c) 352 hrs

d) Cannot be determined

Practice Question Solution 1.4

Sol : Option A

Explanation: Suppose pipe A alone takes x hours to fill the tank.
Then pipes B and C will take x/3 and x/6 hours respectively to fill the tank.
Therefore $1/x + 3/x + 6/x = 1/20 \Rightarrow 10/x = 1/20 \Rightarrow x = 200$hrs

Practice Question 1.5

Three taps P,Q and R can fill a tank in 10,20 and 30hours respectively. If P is open all the time and Q and R are open for one hour each alternately, then the tank will be full in :

a) 6 hrs

b) 6.5 hrs

c) 7 hrs

d) 7.5 hrs

Practice Question Solution 1.5

Sol : Option C

Explanation: (P+Q)'s 1 hour's work = (1/10+1/20) = 3/20

(A+C)'s 1 hour's work = (1/10+1/30) = 2/15

Part filled in 2 hrs = (3/20+2/15) = 17/60

Part filled in 6 hrs = (3×17/60) = 17/20

Remaining Part = (1-17/20) = 3/20

Now, it is the turn of P and Q and 3/20 part is filled by P and Q in 1 hour.

Therefore, Total time taken to fill the tank = (6+1) hrs = 7 hrs

Practice Question 1.6

A tank has a leak which would empty it in 10 hours,a tap is turned on which admits 4 litre a minute into the tank and now it emptied in 12 hours.The capacity of the tank is:

a) 648 litres

b) 1440 litres

c) 1200 litres

d) 1800 litres

Practice Question Solution 1.6

Sol : Option B

Explanation: Let speed of the bike be x km/hr. Let speed of the electric car be y km/hr

$\therefore 200/x + 600/y = 10 \therefore 300/x + 500/y = 11$

Part filled in 1 hour

$= (1/10-1/12) = 1/60$

Time taken to fill the tank = 60 hours

Water filled in 60 hours =4*60*60=1440 litres

Practice Question 1.7

Three pipes A, B and C can fill a cistern in 12 hours. After working at it for 6 hours, C is closed and A and B can fill it in 10 hours more. How many hours will C alone take to fill the cistern?

Practice Question Solution 1.7

Sol. In 6 hours A, B and C would have filled 6 x 1/12 = 1/2 of the cistern. Remaining part is 1 – 1/2 = 1/2, which A and B have filled in 10 hours. → A and B can fill the whole cistern in 10 x 2/1 = 20 hours. Its given that A, B and C can fill the tank in 12 hours. So C can fill the cistern alone in 1/12 – 1/20 = 1/30 = 30. Hence C alone would take 30 hours to fill the tank.

Practice Question 1.8

If two pipes work simultaneously, the tank gets filled in 24 hours. One pipe takes 20 hours longer than the other. How many hours does faster pipe takes to fill the tank working alone?

Practice Question Solution 1.8

Sol. Let us assume that faster pipe takes x hours to fill the tank working alone. Then the slower pipe takes (x + 20) hours to fill the tank working alone. When both of them are working together, it takes 24 hours to fill the tank. Hence $1/x + 1/(x+20) = 1/24$. Solving this equation, we get $x = 40$. So the faster pipe takes 40 hours to fill the tank working alone

Practice Question 1.9

Two filling pipes M and N can fill a tank in 20 hours and 60 hours respectively. There is an outlet P also. If all the pipes are opened together, then tank is full in 40 hours. How much time would be taken by P to empty the full tank if working alone?

Practice Question Solution 1.9

Sol: Let us assume that leak empties the tank in x hours. So 1/20 + 1/60 – 1/x = 1/40. Solving this equation, we get x = 24. Hence the tank would be empty in 24 hours.

Practice Question 1.10

Two pipes A and B can fill a cistern in 32 and 48 minutes respectively. Both pipes being opened, find when pipe B must be turned off, so that the cistern gets filled in 24 minutes?

Practice Question Solution 1.10

Sol: As the cistern is getting filled in 24 minutes, pipe A can fill only 24/32 = ¾ of the cistern in total time. This means the other ¼ must be filled by pipe B. Now B can fill the whole tank in 48 minutes, so ¼ of the tank can be filled in ¼ of 48 minutes i.e. 12 minutes.

Now the pipe B is opened from the beginning, it should be turned off after 12 minutes and that is the answer. OR the standard approach can be applied. Let us assume that B is closed after x min.

Then part filled by (A + B) in x min + part filled by A in (24 – x) min = 1. So x (1/32 + 1/48) + (24 – x) 1/32 = 1. Solving this equation, we get x = 12. So B should be closed after 12 min.

Practice Question 1.11

X can do a piece of work in 20 days. He worked at it for 5 days and then Y finished it in 15 days. In how many days can X and Y together finish the work?

a) 10 Days

b) 15 Days

c) 18 Days

d) 24 Days

e) 32 Days

Practice Question Solution 1.11

Sol : Option A

Explanation: X's five day work = 5/20 = 1/4. Remaining work = 1 – 1/4 = 3/4.

This work was done by Y in 15 days. Y does 3/4th of the work in 15 days, he will finish the work in 15 × 4/3 = 20 days. \ X & Y together would take 1/20 + 1/20 = 2/20 = 1/10 i.e. 10 days to complete the work.

Practice Question 1.12

X can do a piece of work in 30 days. Y can do it in 20 days, and Z can do it in 24 days. In how many days will they all do it together?

a) 6 Days

b) 5 Days

c) 4 Days

d) 4 2/3 Days

e) 8 Days

Practice Question Solution 1.12

Sol : Option E

Explanation: They all will take 1/30 + 1/20 + 1/24 = 1/8. ⇒ 8 days to complete the work

Practice Question 1.13

M and N can do a piece of work in 8 days and O can do it in 24 days. In how many days will M, N, and O do it together?

a) 6 Days

b) 5 Days

c) 4 Days

d) 4 2/3 Days

e) 3 Days

Practice Question Solution 1.13

Sol : Option A

Explanation: They will together take 1/8 + 1/24 = 1/6 ⇒ 6 days to finish the work.

Practice Question 1.14

One man can paint a house in, '10' days and another man can do it in 15 days. If they work together, they can do it in 'd' days, then the value of 'd' is

a) 6 Days

b) 8 Days

c) 12 Days

d) 10 Days

e) 3 Days

Practice Question Solution 1.14

Sol : Option A

Explanation: Total time is d when they are working together = 1/10 + 1/15 = 1/6. ⇒ 6 days to complete the work.

Practice Question 1.15

A can do a piece of work in 9 days and B in 18 days. They begin together, but A goes away three days before the work is finished. The work lasts for

a) 6 Days

b) 8 Days

c) 12 Days

d) 10 Days

e) 3 Days

Practice Question Solution 1.15

Sol : Option B

Let the work lasts for x days.

B works for x days and A works for x – 3 days. $\therefore (x-3)/9 + (x/18) = 1 \Rightarrow x = 8$

Practice Question 1.16

A can do a piece of work in 12 days. B can do this work in 16 days. A started the work alone. After how many days should B join him, so that the work is finished in 9 days?

1. 2 days
2. 3 days
3. 4 days
4. 5 days
5. 1 days

Practice Question Solution 1.16

Sol : Option 4

Explanation:A's work in 9 days = 9/12 = 3/4. Remaining work = 1/4.
This work was done by B in 1/4 × 16 = 4 days.
∴ B would have joined A after 9 – 4 = 5 days.

Practice Question 1.17

A can do a piece of work in 10 days, and B can do the same work in 20 days. With the help of C, they finished the work in 4 days. C can do the work in how many days, working alone?

1. 5 days
2. 10 days
3. 15 days
4. 20 days
5. 25 days

Practice Question Solution 1.17

Sol : Option 2

Explanation: Their combined 4 day work = 4(1/10 + 1/15) = 12/20 = 3/5.

Remaining work = 1 – 3/5 = ⅖.

This means C did 2/5 work in 4 days, hence he can finish the complete work in 5/2 × 4 = 10 days.

Practice Question 1.18

A and B undertake to do a piece of work for Rs. 450. A can do it in 20 days and B can do it in 40 days. With the help of C, they finish it in 8 days. How much should C be paid for his contribution?

1. Rs. 180
2. Rs. 40
3. Rs. 120
4. Rs. 60
5. Rs. 50

Practice Question Solution 1.18

Sol : Option 1

Explanation:A & B would have done 8/20 & 8/40 of the work respectively in 8 days. Together they have done 3/5th of the work. This implies that C has done 2/5th of the work. Thus, C should be paid 2/5th of the amount i.e. 450 × 2/5 = Rs. 180

Practice Question 1.19

Daku and Tamatar can do a piece of work in 70 and 60 days respectively. They began the work together, but Daku leaves after some days and Tamatar finished the remaining work in 47 days. After how many days did Daku leave?

1. 14 days
2. 16 days
3. 18 days
4. 10 days
5. 7 days

Practice Question Solution 1.19

Sol : Option 5

Tamatar would have done 47/60 work in 47 days. The remaining work i.e. 13/60 must have been done by Daku and Tamatar together. They can do the whole work in $60 \times 70 / (60 + 70) = 60 \times 70/130 = 420/13$ days.

So, they would have done 13/60 work in $420/13 \times 13/60 = 7$ days.

Therefore, Daku left the work after 7 days.

Practice Question 1.20

Ajay and Vijay undertake to do a piece of work for Rs. 480. Ajay alone can do it in 75 days while Vijay alone can do it in 40 days. With the help of Pradeep, they finish the work in 25 days. How much should Pradeep get for his work?

1. Rs. 40
2. Rs. 20
3. Rs. 360
4. Rs. 100
5. Rs. 60

Practice Question Solution 1.20

Sol : Option 2

Explanation: In 24 days, they would have done 1/3 and 5/8 of the work.
The remaining work is 1 – (1/3 + 5/8) = 1/24.
This means Pradeep has done 1/24th of the work, so he should be paid 1/24th of the amount i.e. 480 × 1/24 = Rs. 20 is the answer.

Practice Question 1.21

A cylinder will exactly fit into a rectangular box whose internal dimensions are: length 14 cm, breadth 4 cm and height 4 cm. What is the volume of the cylinder?

1. 167 cu cm
2. 176 cu cm
3. 200 cu cm
4. 220 cu cm
5. None of these

Practice Question Solution 1.21

Sol : Option 2

The diameter of the cylinder = 4 cm and its height is 14 cm.

Volume of the cylinder = π x 2 x 2 x 14 = 176 cc

Practice Question 1.22

A lawn, 40 m long and 35 m wide, is surrounded by a path 2 m wide. How many cubic metres of gravel are required to cover the path to a depth of 10 cm?

1. 11.8 cu m
2. 31.6 cu m
3. 62 cu m
4. 13.6 cu m
5. None of these

Practice Question Solution 1.22

Sol : Option 2

The path is formed by two rectangles, which have dimensions as 40 × 35 and 44 × 39. The required quantity of gravel

= area of the path x depth of gravel = [(44 x 39) – (40 x 35)] x 0.10 = 31.6 cu. m.

Practice Question 1.23

An open rectangular tank is made of concrete, the sides and base being 30 cm thick. Internally the tank is 8 m long, 4 m broad and 3 m high. Find its weight in kg, if concrete weighs 1 kg per 1000 cubic centimeter.

1. 34,548 kg
2. 44,416 kg
3. 39,416 kg
4. 40,000 kg.
5. None of these

Practice Question Solution 1.23

Sol : Option 1
The outer dimensions are 8.6 x 4.6 x 3.3 m.
So volume of the block = 8.6 x 4.6 x 3.3 – 8 x 4 x 3 = 130.548 - 96 = 34.548 cu. m = 34548000 cu cm, weight of the block =34548000/1000 = 34548 kg.

Practice Question 1.24

A triangle inscribed in a circle with shorter sides is 3 and 4 units long. If the longer side is the diameter, find the length of the diameter.

1. 5
2. 20
3. 30
4. 40
5. 50

Practice Question Solution 1.24

Sol : Option 1

If the longer side is the diameter, then this triangle is a right–angled triangle.

Hence length of diameter = $\sqrt{4^2 + 3^2} = \sqrt{16+9} = \sqrt{25} = 5$units

Practice Question 1.25

The length and breadth of rectangle Park is 56m and 44 m respectively. If a concrete path of width 4 m is made outside and along the length & breadth of rectangle. Find the area of concrete path.

1. 864 m^2
2. 432 m^2
3. 216 m^2
4. 108 m^2
5. None of these

Practice Question Solution 1.25

Sol : Option 1
Given that ; Length of park= 56m, breadth of park= 44m
Area of park = 56×44=2464
Length of rectangle after including concrete path= 56+8= 64,
Breadth of rectangle after including concrete path= 44+8= 52,
Area of rectangle including concrete path= 64×52=3328
Area of concrete path= 3328-2464=864m^2

Practice Question 1.26

How many coins 3 mm thick and 1.2 cm in diameter should be melted in order to form a right circular cylinder, having base diameter 4 cm and height 27 cm?

1. 850
2. 950
3. 980
4. 1000
5. 900

Practice Question Solution 1.26

Sol : Option 4

Let the number of coins be n. We have

$n \times \pi \times (1.2/2)^2 \times 0.3 = \pi (4/2)^2 \times 27$

$\Rightarrow n = 1000$

Practice Question 1.27

The diameter of a sphere is 10 inches. What are its volume and surface area?

1. 50, 25
2. $10\pi/3$, 15π
3. $500\pi/3$, 100π
4. $75\pi/2$, $35\pi^2/3$

Practice Question Solution 1.27

Sol : Option 3

The radius is half the diameter or 5 inches.

We use r = 5 in the formulas for volume and surface area.

Volume: $V = 4/3\pi 5^3 = 500\pi / 3$ cubic inches

Surface area: $S = 4\pi 5^2 = 100\pi$ square inches.

Practice Question 1.28

A regular hexagonal prism has its perimeter of base as 600 cm and height 200 cm. Find weight of petrol that it can hold if density is 0.8 g/cc. (Take $\sqrt{3} = 1.73$)

Practice Question Solution 1.28

Sol: Side of hexagon = (Perimeter) / (Number of Sides) = 600/6 = 100 cm.
Area of regular hexagon = (3√3) / 2 x 100 x 100 = 25,950 sq.cm.
Volume = Base Area × height = 25950 x 200 = 5,190,000 cu.cm

Weight of petrol = Volume x Density = 5,190,000 cc × 0.8 g/cc = 4,152,000 gm. = 4,152 kg.

Practice Question 1.29

If the length of a rectangle is increased by 10% and the breadth decreased by 20%, a square of area 484 m^2 is obtained. What is the area of the rectangle in square meters?

Practice Question Solution 1.29

Sol: Let the length of the rectangle is 'l' and its breadth is 'b'. Now the length is increased by 10% and its breadth is decreased by 20% and the resulting area is 484 m^2. So we have

$1.1l \times 0.8b = 484 \Rightarrow lb = 550\ m^2$. $\therefore$ Area of rectangle = 550 m^2.

Practice Question 1.30

The radius of a circle is decreased by 20%. What will be the percentage decrease in its surface area?

Practice Question Solution 1.30

Sol: New radius is 0.8 times the previous radius. Therefore the new surface area will be 0.8 x 0.8 = 0.64 times the previous surface area. So, the percentage decrease is 36%.

Practice Question 1.31

The arithmetic mean between two numbers is 75 and their geometric mean is 21. Find the numbers.

A. 133 and 17

B. 63 and 87

C. 3 and 147

D. 73 and 77

Practice Question Solution 1.31

Sol : Option C

Let the required numbers are ‘a’ and ‘b’.

We have = 75 ⇒ a + b = 150 ....(i)

Also = 21 or ab = 441

We know that $(a-b)^2 = (a+b)^2 - 4ab = 150^2 - 4 \times 441 = 22500 - 1764 = 20736$

⇒ a – b = 144 ....(ii)

Adding (i) and (ii), we get 2a = 294 ⇒ a = 147

(i) ⇒ b = 3.

So the numbers are 147 and 3.

Practice Question 1.32

The product of first three terms of a G. P. is 512. If we add 2 to its second term, the three terms form an A. P. Find the terms of the G. P.

A. 4, 8, 16

B. 16, 8, 4

C. 12, 24, 48

D. Option A or B

Practice Question Solution 1.32

Sol : Option D
Let the first three terms of G.P. are ,a,ar
Given that x a x ar = 512 $\Rightarrow a^3 = 512 \Rightarrow a = 8$
Now ,a+2 are in A.P.
$\Rightarrow (a+2)- = ar - (a-2)$
$\Rightarrow 10 - = 8r - 10$
$\Rightarrow 8r + = 20$
$\Rightarrow 8r^2 - 20r + 8 = 0$
$\Rightarrow 2r^2 - 5r + 2 = 0$
$\Rightarrow 2r^2 - 4r - r + 2 = 0$
$\Rightarrow 2r(r-2) - (r-2) = 0$
$\Rightarrow (2r-1)(r-2) = 0$
$\Rightarrow r = 2$ or
When r = 2, the terms are 4, 8, 16
When r = 1/2, then the terms are 16, 8, 4.

Practice Question 1.33

A piece of equipment costs a certain factory INR 600,000. If it depreciates in value, 15% in the first year, 13.5 % in the next year, 12% in the third year, and so on, what will be its value at the end of the 10 years, all percentages applying to original cost?

A. 2,00,000

B. 1,05,000

C. 4,05,000

D. 6,50,000

Practice Question Solution 1.33

Sol : Option B

Explanation: Let the cost of the equipment be Rs. 100.

Now, percentages of depreciation at the end of 1st, 2nd, 3rd years are 15, 13.5, 12, respectively which are in A.P., with a = 15 and d = - 1.5.

Hence, percentage of depreciation in the tenth year = a + (10-1) d = 15 + 9 (-1.5) = 1.5

Also total value depreciated in the 10 years = 15 + 13.5 + 12 + ... + 1.5 = 82.5

Hence, value of equipment at end of 10 years=100 - 82.5 = 17.5.

The total cost being Rs. 6, 00,000/100 * 17.5 = Rs. 1, 05,000.

Practice Question 1.34

The sum of third and ninth term of an A.P is 8. Find the sum of the first 11 terms of the progression.

A. 44

B. 22

C. 19

D. None of the above

Practice Question Solution 1.34

Sol : Option A

Explanation: The third term $t_3 = a + 2d$

The ninth term $t_9 = a + 8d$

$t_3 + t_9 = 2a + 10d = 8$

Sum of 1st 11 terms of an AP is given by

$S_{11} = 11/2\ [2a + 10d]$

$S_{11} = 11/2 * 8 = 44$

Practice Question 1.35

An AP consists of 50 terms of which 3rd term is 12 and the last term is 106. Find the 29th term.

A. 25

B. 64

C. 50

D. 27

Practice Question Solution 1.35

Sol : Option B

Explanation: $12 = a + 2d$

$106 = a + 49d$

So, $106-12 = 47d$

Or, $94 = 47d$

So, $d = 2$

Hence, $a = 8$

And, $n_{29} = 8 + 28*2 = 64$.

Practice Question 1.36

x, 17, $3x - y^2 - 2$ and $3x + y^2 - 30$ are four consecutive terms of an increasing arithmetic sequence. The sum of the 4 numbers is divisible by:

A. 2

B. 3

C. 5

D. 7

Practice Question Solution 1.36

Sol : Option A
Explanation: Of all the 4 terms in AP, the 2nd term is 17, which is an odd number.
The common difference has to be either even or odd.
Possibility 1: If the common difference is odd, 1st term will be even, 3rd term will be even and the 4th term will be odd.
i.e., two of the terms of the sequence are odd & two are even.
Sum of two odd numbers and two even numbers is even.
Possibility 2: If common difference is even, all 4 terms will be odd.
Sum of 4 odd numbers is even.
So, irrespective of whether common difference is odd or even, the sum of four terms is even.
Hence, the sum will be divisible by 2

Practice Question 1.37

What is the sum of the following series? -64, -66, -68, ... , -100

A. -1458

B. -1558

C. -1568

D. -1664

Practice Question Solution 1.37

Sol : Option B

Explanation: The sum of any set of numbers = Average of the numbers * number of terms

1. Step 1: Compute Average

Average of terms of an arithmetic sequence = [first term + last term/2]

Average of this sequence = [−64 −100]/ 2 = -82

2. Step 2: Compute Sum:

Sum = Average * number of terms

We have computed the no. of terms in the text book approach.

Number of terms = 19.

Therefore, sum = (-82) * 19 = -1558

Practice Question 1.38

n an AP, the ratio of the 2nd term to the 7th term is 1/3. If the 5th term is 11, what is the 15th term?

A. 28

B. 31

C. 33

D. 36

Practice Question Solution 1.38

Sol : Option B

The 2nd and the 7th terms are (a + d) and (a + 6d) respectively. The ratio of these terms is 1/3. Solving this ratio, we get 2a = 3d. The 5th term is (a + 4d) = 11. Substituting for a, we get a = 3 and d = 2. Therefore, the 15th term is (a + 14d) = 31.

Practice Question 1.39

In an AP, the sum of the first 3 terms is -36 and that of the last 3 is 27. If there are 10 terms, what are the 1 st term and the common difference respectively?

A. 15, 3

B. -15, 3

C. 15, -3

D. -15, -3

Practice Question Solution 1.39

Sol : Option B

The AP can be expressed as a, (a + d), ---, (a + 9d). The sum of the first 3 terms is (3a + 3d) = -36 and the sum of the last 3 terms is (3a + 24d) = 27. Solving these two equations, we get a = -15 and d = 3.

Practice Question 1.40

In an AP, the sum of the first 3 terms is – 60 and that of the last 3 are 84. If there are 15 terms, what is the sum of the middle 3 terms?

A. 8

B. 12

C. 16

D. 24

Practice Question Solution 1.40

Sol : Option B

Since the number of terms is odd, the AP can be expressed as (a – 7d), (a – 6d), ---, a, ---, (a + 6d), (a + 7d). The sum of the first 3 terms is (3a – 18d) = -60 and the sum of the last 3 terms is (3a + 18d) = 84. Solving these two equations, we get a = 4 and d = 4. Since the middle term is 4, the sum of the middle 3 terms is 12.

Resources and Books

Fast Track Objective Arithmetic by Rajesh Verma – Arihant Publication.

https://prepinsta.com/tcs-digital/

https://www.indiabix.com/aptitude/questions-and-answers/

https://www.hitbullseye.com/Quant

Thank you