Preparation Guide for **MBA Entrance Exams**

Quantitative Aptitude

Traditionally, management aptitude tests evaluate aspirants on four basic aptitude skills: Quantitative Aptitude, Data Interpretation, Logical Reasoning and Verbal Aptitude. Generally, Quantitative Aptitude has been occupying 1/3rd of the test papers, year after year. We have tried to suggest a preparation plan keeping all these factors in mind.

Index

Introduction to QA:

Let's start with the understanding of this subject. Quantitative Aptitude section can be divided in 4 parts.

Major Areas	Chapters	Expected No. of Questions (for a Quant section having 34 questions)
Arithmetic	Numbers, Percentage, Profit & Loss, Simple and Compound Interest, Ratio, Proportionality, Time-Distance, Time-Work, Mixtures, Averages, Partnership	13 to 15
Algebra	Linear Equations, Quadratic Equations, Inequalities, Logarithm, Surd- Indices, Functions	6 to 8
Advance Mathematics	Permutation and Combinations, Probability, Set Theory, Progression and Series	4 to 6
Geometry	Line, Angles, Triangles, Quadrilaterals, Polygon, Circles, Areas, Volume, Height and Distance, Co-ordinate Geometry, Basic Trigonometry	6 to 9

Many of the chapters comprise a good amount of theory portion. But most of the times, theory is used to solve application problems, only. A question directly asking a property is a rarity.

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Quantitative Aptitude — Preparation Plan

As the dates for management entrance exams gets closer, the value of every single day and every single hour being invested goes up drastically. Having a clear plan of action will certainly enable you to make better use of time, and also increase the chances of deriving far better returns on this invested time.

Let's assume that you intend to invest around 100 hours (this number could differ for different students and the rest of the things will proportionately alter) in your preparation for the QA section. This excludes the hours spent in your classroom coaching, mock tests and their analysis. This simply is the time you spend by yourself on improving the various topics in the specific section – QA.

QA section can be seen as a combination of Arithmetic (excluding Number Systems, which can also be seen as a separate entity), Algebra and Geometry. An indicative breakup among the 4 areas could be as follows:

Area	Hours
Number Systems	12
Arithmetic	28
Algebra	30
Geometry	30

But the above breakup assumes an equal proficiency across all 4 areas, which is unlikely to be true for most of you. Hence, you can possibly take away around 10 hours from 2 of your strongest areas and invest them in one/two of your weakest area(s) among the four. So, if you are weak in Arithmetic, just about average in Number Systems, strong in Geometry, and very strong in Algebra, the break-up could be tweaked to look something like:

Area	Hours
Number Systems	15
Arithmetic	35
Algebra	24
Geometry	26

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This is just an example of how best to plan your time investment. It is also advisable not to use up the entire quota for any specific area in one go and use the same in tranches. For example, you could break the total time into roughly 3 phases, using around one-third of the allotted hours in each while moving across areas in sequence and then return to the first one again and so on. This will ensure that you stay in touch with all the areas through to the end. A smart way also would be to keep the last iteration for revision. Alternatively, you could account for that in your overall time and keep around 15% of total hours blocked for revision at the end. In that case, you can plan for only 85% of the time in that section in the manner suggested above.

The general tendency is to do more in areas that you are already comfortable in. If you are more interested in Arithmetic, for example, chances are you will spend more time on it, despite being relatively better placed in it. On the other hand, you will keep avoiding areas/topics that you are relatively weaker in (and they are also likely to be the ones you are less interested in). Proceeding that way, you will never improve in areas that you really need to improve in.

It is also argued by some that you should invest more in your strengths to make them stronger. But the point is that if you are already at say 90 (on a scale of 100) in a given area/topic, there is no point in investing more time. You simply need to do more questions that are in the top 10%. Practicing more questions at levels lower than 90 in that area/topic will be a waste of time.

Within each of the 4 areas also, you should spend more time on topics you are weaker in, and less time on topics you are stronger in – doing questions only at levels higher than your current levels. This approach will enable you to derive maximum output from your time/efforts invested in the preparation. Having a clear plan of the time you need to invest in each topic in QA will also ensure urgency apart from pushing you to be more consistent in your efforts.

How to identify and be able to spend that time according to your needs, is where your coaching/mentors/guidance needs to adapt to your needs! Increasingly, across all levels of education, one-size-fits-all approach is being abandoned for its inefficiency and ineffectiveness.

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Success Mantras to crack Quant Section

Management entrance exams are not about how much an aspirant knows, but about how much knowledge can he/she apply in the given time limit with the given constraints of sectional partitions. Some of the points to be taken care of are:

Practice chapter by chapter: There is a difference between being able to solve a problem and solving the same problem effortlessly. Depending on the difficulty level of the test paper, 15 to 25 questions should be of easy to moderate level. Practice of easy to medium questions of all the chapters would enable an aspirant to sail through the questions easily.

Our Advice: *Know basic theories and varieties of problems of all chapters.*

Short methods and Group Studies: Nothing boosts confidence of an aspirant more than a question which he/she can solve without lifting the pen in an ongoing test. More such questions, better the score. This can be achieved by improving mental calculation and by discussing unconventional methods with a focused study group. Many times it involves use of options to get the correct answer.

Our Advice: *Two is more than one. Three is even better. Do a regular discussion of short methods among your focused study group.*

Building Stamina: Quant should be the last section of the test paper. An aspirant who hasn't developed stamina for the last hour would be challenged to deliver his/her regular performance.

Our Advice: *Study for 3-4 hours at a stretch while doing practice.*

Testing Skills Development: Having 10% to 30% of the problems as speed-breakers is an expected situation in a Quant section in management entrance exams. Being able to find them without wasting time in solving them is the key. It's a skill which can be achieved by sufficient practice of huge number of problems and by going through sufficient number of mock papers.

Our Advice: *Plan to write approximately 20-25 Mock papers.*

Mental Calculation: Few management entrance exams offer Basic Calculator to all the test takers. This will still not reduce the importance of mental calculation. Since it's an on-screen calculator, mental calculation will win against the calculator in time consumption in most of the cases.

Our Advice: *Do enough practice of basic summation, subtraction, tables and fractions.*

Remember, solving the chapters for the first time teaches you Mathematics. Second time, it brings speed in solving. Aspirants are advised to solve all the chapters twice to get the advantage of speed in the exam.

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Tricks to maximise your score in Quant section

Building strong fundamentals in various topics
It's suggested that you do not leave any topic and prepare for all topics, since easy questions may get asked from any topic. It is ok if you have different levels of comfort and confidence in different topics but not total ignorance.

Practicing regularly under time pressure
While it is important to know how to solve the questions, it is equally important that you learn to solve them in the least possible time. Practicing under time pressure will help you to simulate exam conditions and result in improved time management. Take timed, online topic-wise and sectional tests to build comfort in taking online tests.

Scanning and selection of questions
It is critical that you read all the questions to identify the ones you feel you can solve in the least amount of time – you may fix a time limit of about 2-2.5 minutes per question. If it appears to you that the question may take longer than this time limit, you should move on and tackle the next question(s) that appears doable within this time limit.

Leaving out questions
Some students become nervous if the first 2-3 questions appear difficult. Please remember that only a handful of students will be able to successfully attempt almost all the questions in this section. So, even if you attempt about 20 questions, it may fetch you a good score and percentile. So, don't worry if some questions are left without attempting after you have read them.

Time management
Since you need to attempt more questions in less time, it is suggested that you fix an 'exit time' depending upon your competence level. For example, an exit time of two minutes will mean that if a question is nowhere close to getting solved after spending two minutes on it, you will leave it and move on.
Most students make the mistake of continuing with the question with the hope that 'I know I can solve it' but end up spending as much as 10 or more minutes trying to solve it. Even when the question is solved in 10 minutes, you have wasted time that could have been better utilized in solving more and easier questions.

Sub-sectional cut-off
There is no sub-sectional cut-off and you do not have to score some minimum marks in Quantitative Aptitude and Data Interpretation areas separately. It is the total score that will count.

No guessing
In this section, there is no need for you to guess just because it can result in more attempts. Higher attempts through guessing will result in lower marks!

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Quant Trends in CAT over a period of 5 years

CAT 2016

- Moderate to High Difficult Level
- Well-designed section
- Surprise was higher weightage of geometry questions
- Challenge was to go through all questions as there were a lot of speed breakers
- Attempting 18-20 questions would have been optimum. However the sectional cut-off could be cleared with about 15 attempts

CAT 2015

- Standard & clinical
- The overall section was easy and had questions from almost every topic mentioned in CAT 2015 syllabus
- Such a paper has advantages as well as disadvantages – you should have been prepared with everything and just in case you would have left just a chapter or two, the damage isn't astounding. Hence, a cheer-worthy paper for a prepared test taker
- 27 attempts with 90% accuracy could be classified as a good score in this section

CAT 2014

- QA was easier in comparison to last couple of years' CAT papers
- This could be equated to the paper which was conducted 5 years back in 2009 when the first online version of CAT was conducted
- 34 questions were distributed into 15 easy, 15 moderate and 4 difficult questions
- By 15 easy, it's meant that the ones which are direct applications of concepts from classical chapters like number systems, geometry, time and distance, time and work etc
- Quite a balanced paper with a good representation of all the chapters of quantitative aptitude
- Just one question of trigonometry which meant it wouldn't have an impact per se
- Identifying the speed breakers and leaving them – that would be the key as far as Quantitative Aptitude is concerned

CAT 2013

- This section could be termed as Moderate to Difficult on difficulty level
- The Quantitative Aptitude had around 6-7 questions of Geometry & Mensuration, around 6-7 questions were spread across Algebra, 6-7 questions spread across Arithmetic
- Out of these, around 9 to 10 could be termed as easy and 5 to 6 as moderate and the remaining time consuming
- To do justice to this subsection, an allocation of 50 mins could be termed appropriate and an above average test taker would end up attempting 13-15 in the 50 mins with 90% accuracy
- The whole game was of question selection and prompt navigation through the paper
- A student with high ego or a high stickiness factor to a particular question or a particular genre of questions would find it difficult to reach the end of the paper
- The one who plays on good accuracy would be the eventual winner

CAT 2012

- There were 21 questions of QA
- The difficulty level was high and the questions were designed to test a candidate's grasp of fundamentals
- There were questions from regular topics like Number System, Algebra, Geometry, Modern Math and Geometry

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Few Quantitative Aptitude solved questions

Question 1. A dishonest shopkeeper sells sugar at cost price but makes 25% profit by using faulty weights. He decides to give a discount to attract more customers. What percent of discount should he offer to make 12% profit?

1] 15.2%   2] 12.5%   3] 10.4%   4] 13%

Answer:

1. Assume the shopkeeper sells x kg sugar at C.P to gain a profit of 25 %.

Therefore the cost of 1 kg of sugar = $\frac{C.P}{x}$

$$\therefore 25 = \frac{\frac{C.P}{x} - C.P}{C.P} \times 100$$

$$\therefore x = \frac{4}{5}\,kg = 800 \text{ grams at C.P}$$

Now the shopkeeper gives discount make a profit of 12%.

Let y be the percentage discount.

$$\frac{S.P - \frac{y}{100} \times S.P - C.P}{C.P} \times 100 = 12$$

But we know S.P = 1.25C.P

Solving for y we get $y = \frac{13}{1.25} = 10.4$ %. Hence,

[3].

Alternatively,

if 100 is the C.P, then 125 is the S.P since he is making a profit of 25%. A profit of 12% means an S.P of 112 and a discount of 13; 13 will be just over 10% of 125 (10% is 12.5, moving one decimal to the left) and only one option is between 10 and 11 %.

Question 2. N is a natural number having the sum of its digits as 3. If 101314, then how many values can 'N' assume?

1] 93   2] 91   3] 78   4] 105

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Answer:

As $10^{13} < N < 10^{14}$

N will have 14 digits

Case 1: Digits are 1, 1, 1 and remaining 11 digits are 0's

Number can start only with 1

Number of possible ways $\Rightarrow 1 \times \frac{13!}{11!\,2!} \Rightarrow \frac{13 \times 12}{2}$

$= 78$

Case 2: Digits are 1, 2 and remaining 12 digits are 0's

Number can start only with 1 or 2

Number of possible ways $\Rightarrow 2 \times \frac{13!}{12!} \Rightarrow 2 \times 13$

$= 26$

Case 3: Digits are 3 and remaining 13 digits are 0's Only one such number if possible

Number of possible ways $= 78 + 26 + 1 = 105$.

Hence, [4].

Alternatively,

If the number is a 2 digit number then it can be either 21, 12 or 30. If it is 3 digit number it can be 201,210, 102, 120, 300, 111.

So the number of values N can take depends on the number of digits. 10^1 has 2 digits, 10^2 has 3 digits.... 10^{13} will have 14 digits; so N will have 14 digits.

N can either be a number

- with three 1s: start with 1 and have the remaining two 1s in any of the remaining 13 places; twoplaces out of 13 can be chosen in $^{13}C_2 = 13*12/2 = 78$ numbers

- with a 2 & 1: start with 2 and have the 1 in any of the 13 remaining places = 13 numbers ; start with 1 and have the 2 in any of the 13 remaining places = 13 numbers ;

- or a number starting with 3 followed by 13 zeroes. So, total number of values N can assume are 78 +13+13+1 = 105

Question 3. Two barrels A and C contain alcohol and water in the ratio 1:a and 1:c, respectively. Equal quantity of mixtures from barrels A and C are mixed to get a mixture with alcohol and water in the ratio 1:b, where b is the arithmetic mean of a and c. What can be the value of a + b + c, if a, b and c are integers?

1] 14 2] 10 3] 15 4] 8

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Answer:

By alligation formula,

$$\begin{array}{ccc} \frac{1}{a+1} & & \frac{1}{c+1} \\ & \frac{1}{b+1} & \\ 1 & & 1 \end{array}$$

$\therefore \frac{1}{a+1} - \frac{1}{b+1} = \frac{1}{b+1} - \frac{1}{c+1}$

$\therefore \frac{2}{b+1} = \frac{1}{a+1} + \frac{1}{c+1}$

$\therefore \frac{2}{\left(\frac{a+c}{2}\right)+1} = \frac{a+c+2}{(a+1)(c+1)}$

$\therefore \frac{4}{a+c+2} = \frac{a+c+2}{(a+1)(c+1)}$

$\therefore (a+c+2)^2 = 4(a+1)(c+1)$

$\therefore ((a+1)+(c+1))^2 = 4(a+1)(c+1)$

$\therefore ((a+1)-(c+1))^2 = 0$

$\therefore a+1 = c+1$

$\therefore a = c = b$ (as b is the arithmetic mean of a and c)

Thus, $a + b + c$ will be a multiple of 3. Hence, [3].

Alternatively,

If b is the arithmetic mean of a and c then $2b = a + c$. Therefore $a + b + c = 2b + b = 3b$. So $a + b + c$ has to be a multiple of 3. There is only one option which is amultiple of 3.

Question 4. Given 2 positive integers, 'x' and 'y' with x

1] 10 and 1990 2] 900 and 1880 3] 1 and 1890 4] 1 and 900

Answer:

Since x is a 2 digit number,the highest value it can take is 99 and the lowest value it can take is 10..Similary ,the lowest value y can take is 100 and the highest value it can take is 199.

Case 1: $x = 10$ and $y = 199$

$z = \frac{199-10}{10} \times 100 = 1890\%$

Case 2: $x = 99$ and $y = 100$

$z = \frac{100-99}{99} \times 100 \approx 1\%$. Hence, [3].

Alternatively,

All that the question is asking you to determine is the maximum and minimum difference that there can be between x and y.

Min difference: $x = 99$, $y = 100$; therefore $z = 1/99 = 1\%$

Max difference: $x = 10$, $y = 199$; therefore $z = 189/10 = 1890\%$

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Question 5. Ajay plans to host a lunch for his friends at a restaurant. He decides to keep 1 starter and 2 main courses for the lunch. From the menu, he realizes that there are only 15 ways to fulfill his requirement. What can be the total number of dishes available on the menu?

1] 4 2] 5 3] 6 4] 7

Answer:

5. Let the total number of dishes be 'n' and total number of starters be 'x'. So the number of main course dishes will be 'n – x'

According to given data

$^{x}C_1 \times {}^{n-x}C_2 = 15$

Using values of n from the option

1. $x \times (4 - x)(3 - x) = 30$

x can assume values only 1 and 2, as number of starters can assume only a positive value and has to be less than 'n'.

In this case no value of x can satisfy the above equation

2. For n = 5,

$x \times (5 - x)(4 - x) = 30$

Neither of x = 1, 2 or 3 satisfies the above equation

3. For n = 6

$x(6 - x)(5 - x) = 30$

Neither of x = 1, 2, 3 or 4 satisfies the above equation.

4. For n = 7

$x(7 - x)(6 - x) = 30$

For x = 1, the above equation is satisfied.

Also for x = 2, 3, 4 or 5 the above equation is not satisfied. So the total number of dishes can be 7. Hence, [4].

Alternatively,

If I have 3 shirts and 3 trousers and I need to pack any 1 shirt and 2 trousers for a trip, I can do so in $^{3}C_1 * {}^{3}C_2 = 3*3 = 9$ ways. So the number of combinations possible is dependent on the number of items of each I have. The problem is similar to this. If there are m and n starters and main course dishes available, then the possible combinations are $^{m}C_1 * {}^{n}C_2 = m*n(n\ 1)/2 = 15$

m*n*n 1 = 30. Now, the maximum value of n can be 6, since beyond that the value of 6, m*n*n 1 will be greater than 30.

So if n = 6 then m = 1 and m+n = 7

If n = 5 or 4, then m will be a fraction which is not possible

If n = 3, then m = 5 and m + n = 8

If n = 2 , then m = 15 and m+n = 17

Only 7 is there in the options.

Question 6. If 'a' is positive and a4 - 62a2 + 1 = 0, find the value of a3 + 1/a3

1] 648 2] 392 3] 488 4] 512

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Answer:

$a^4 - 62a^2 + 1 = 0$ Divide the equation by a^2

$$a^2 - 62 + \frac{1}{a^2} = 0$$

$$a^2 + \frac{1}{a^2} = 62$$

$$a^2 + \frac{1}{a^2} + 2 = 64$$

$$\left(a + \frac{1}{a}\right)^2 = (8)^2$$

$$\therefore a + \frac{1}{a} = 8 \quad [\because a > 0]$$

$$\left(a + \frac{1}{a}\right)^3 = a^3 + \frac{1}{a^3} + 3\left(a + \frac{1}{a}\right)$$

$$a^3 + \frac{1}{a^3} = (8)^3 - 3(8)$$

$= 512 - 24 = 488$. Hence, [3].

Alternatively,

$a^2 (a^2 - 62) = -1$ Since 'a' is positive a^2 cannot be equal to -1. So $a^2 - 62 = -1$ or $a^2 = 61$. Now since the options are far apart, you can easily take $a^2 = 64$ and then approximate $a = 8$. Then $a^3 + 1/a^3 = 8^3 + 1/8^3$, which is approximately equal to $8^3 = 512$. Since we have approximated the value of 'a' slightly higher than its actual value, the answer will be less than 512, which is one of the options. The best option to choose will be 488 since 'a' is only slightly less than 8.

Question 7. A six-faced unbiased die is thrown ten times. The results of these ten throws are written side by side, from left to right so as to form a ten-digit number, such that the first four digits form a four digit number which is the greatest four-digit square possible. Similarly, the next three digits, next two digits and the last digit form the greatest possible three-digit, two-digit and one-digit perfect squares respectively. Find the sum of digits of that ten-digit number.

1] 45 2] 46 3] 42 4] Cannot be determined

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Answer:

We know, the first four digits form the square of an integer.
The largest possible result of the four throws can be 6666. $\sqrt{6666} > 81$
$81^2 = 6561$
$\therefore$ The first four digits are 6, 5, 6 and 1.
Similarly, for the next three digits $\sqrt{666} > 25$
$25^2 = 625$
$\therefore$ next three digits are 6, 2, 5
Similarly, the next two digits are 6, 4 and the last digit is 4.
The number is 6561625644.
Sum = 45.
Hence, [1].
Alternatively,
Unbiased die might remind people of probability and the problem is long, the result— leave the question. But it is actually a simple LR problem. All you need to do is find the sum of the largest 4,3,2 and 1 digit perfect squares using digits 6 to 1. In all cases, the largest one has to start with 6.
4 digit —You know 80*80 is 6400, so the largest will be closest to this, so try 81*81 and 82*82 and you will quickly reach 6561 (81*81).
3 digit — The only 3 digit perfect squares starting with 6 are 25*25 = 625 and 26*26 = 676, which is not possible 2 digit — has to be 64 and 1 digit — has to be 4

Question 8. On a 120 kms racing track, if P and Q start driving in the same direction from the same point and at the same time, then P wins the race by 25 minutes. If they drive towards each other from the opposite ends on the same track starting at the same time, the distances that P and Q cover when they meet are in the ratio 3:2. Find the speed of P's car.

1] 96 kmph 2] 48 kmph 3] 144 kmph 4] 72 kmph

Answer:

P and Q cover the distances in the ratio 3 : 2 in the same time.
$\therefore$ Speeds of P and Q are 3x kmph and 2x kmph, respectively.
While driving in the same direction, Q takes 25 minutes more to cover 120 km than P.

$$\therefore \frac{120}{2x} - \frac{120}{3x} = \frac{25}{60}$$

$$\therefore \frac{1}{x}(60 - 40) = \frac{25}{60}$$

$$\therefore x = \frac{20 \times 60}{25} = 48$$

$\therefore$ Speed of P's car = 3x = 3 × 48 = 144 kmph.
Hence, [3].
Alternatively,
When the they are running in the opposite direction the distance covered is 3:2. Even when they are running in the same direction, the distances covered when P reaches the end will be in the ratio 3:2 (since their speeds are the same). Therefore, when P is at 120, Q is at 80 and to cover 40, Q needs 25 minutes. So, Q's speed is 40/(25/60) and P's speed is 3/2 of Q's speed.

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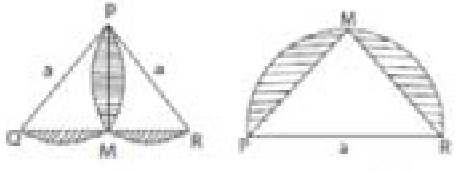
Question 9. PQR is an isosceles right angled triangle with ?QPR = 90°. Semicircles are drawn with PQ and PR as diameters. Find the ratio of the area of the shaded region to the area of the triangle PQR.

Answer:

Given below is the main figure (a) and one half of the main figure as indicted by figure (b).



(a) (b)

Let PR = 'a' units

$\Delta PMR = \frac{1}{2} \times PR \times \text{height} = \frac{1}{2} \times a \times \frac{a}{2} = \frac{a^2}{4}$

Area of the semi-circle in fig (b) $= \frac{\pi}{2}\left(\frac{a}{2}\right)^2 = \frac{\pi a^2}{8}$

Area of shaded region in fig (b) $= \frac{\pi a^2}{8} - \frac{a^2}{4}$

" " " fig (a) $= 2\left[\frac{\pi a^2}{8} - \frac{a^2}{4}\right]$

$= \frac{\pi a^2}{4} - \frac{a^2}{2}$

$= \frac{a^2(\pi - 2)}{4}$

Area of $\Delta PQR = \frac{a^2}{2}$

$\therefore$ Required ratio $= \frac{(\pi - 2)a^2}{4} \times \frac{2}{a^2}$

$= \frac{\pi - 2}{2}$ Hence [3].

Alternatively,

The shaded area is nothing but the sum of the difference between each semi circle and the triangle inside it. Since both halves are are symmetric the area of the shaded region is nothing but Area (Sum of semi circles – sum of triangles) = Area (Circle – Triangle)

If PQ = r, then area of circle = $\pi r^2/4$ and area of triangle = $r^2/2$

Required Ratio = Area(Circle – Triangle)/ Area(Triangle) = Circle/Triangle – 1 = $\pi/2 - 1$

Question 10: If the nth term of a series is Tn = n3 – (n – 1)2, then find the sum of the first n terms of the series.

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Answer:

$$\sum_{i=1}^{n} t_i = \sum_{i=1}^{n} i^3 - \left[\sum_{i=1}^{n} i^2 - 2i + 1\right]$$

$$= \left(\frac{n(n+1)}{2}\right)^2 - \frac{n(n+1)(2n+1)}{6} + \frac{2n(n+1)}{2} - 1$$

$$= \frac{n^2(n^2+2n+1)}{4} - \frac{n(n+1)(2n+1)}{6} + n^2 + n - n$$

$$\Rightarrow \frac{n^4+2n^3+n^2}{4} - \frac{(n^2+n)(2n+1)}{6} + n^2$$

$$= \frac{3n^4+6n^3+3n^2-2(n^2+n)(2n+1)+12n^2}{12}$$

$$= \frac{3n^4+6n^3+3n^2-4n^3-2n^2-4n^2-2n+12n^2}{12}$$

$$= \frac{3n^4+2n^3+9n^2-2n}{12}$$ Hence, [1].

Alternatively,

For n = 1, only option [1] and [2] hold. For n = 2, only option [1] holds.

Question 11: A task was given to a manager who had 14 members in his team. At any moment of time exactly 10 members worked simultaneously on the task. Since, the manager had to be fair in his work allocation, he allocated the task among the workers in such a way that each mem ber worked on the task for exactly 't' minutes. If the task was completed in 210 minutes, then find the value of 't'. (Assume the efficiency of each of the members of the team is the same)

1] 15 2] 150 3] 21 4] 60

Answer:

10 out of 14 members can be selected in $^{14}C_{10}$ = 1001 ways. So there will be a total of 1001 groups working on the given tasks for a total of 210 minutes. To find out the amount of time a single member has worked on the given task, we calculate the number of groups in which he is not present. So the number of groups in which a particular member of the team is not present = $^{13}C_{10}$ = 286. So 1 member of the team will be present in 1001 − 286 = 715 groups. By proportionality rule, 715 groups will work for a total of $\frac{715}{1001} \times 210 = 150$ minutes. Since the member is present in each of these 715 groups he will work for a total of 150 minutes. Hence, [2].

Alternatively,

At any instant, 10 members work together. So the total man-minutes required to complete the work = 210*10

Since the work is distributed equally among the 14 people, the time for which each person works = 210*10/14 = 150 minutes

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