2017 CAT Answer Key

Directions of Test

Test Name	2017 CAT	Total Questions	100	Total Time	180 Mins

Section Name	No. of Questions	Time limit	Marks per Question	Negative Marking
Verbal Ability	34	1:0(h:m)	3	1/3
DI & Reasoning	32	1:0(h:m)	3	1/3
Quantitative Ability	34	1:0(h:m)	3	1/3

QNo:- 1 ,Correct Answer:- *B*

Explanation:- *In the passage, the author clearly highlights that there is more to the case of Socrates than the theory that he was unfairly persecuted. In fact, the author introduces evidence and facts that point out the shortcomings of Socrates. This makes option 2 the best answer in the given case.*

QNo:- 2 ,Correct Answer:- *D*

Explanation:- *In the given passage, the author adopts a very simple purpose: to highlight how the trial of Socrates has been interpreted in a certain way and how this might not necessarily be the right way to go about it. This makes option 4 the correct answer in this case.*

QNo:- 3 ,Correct Answer:- *C*

Explanation:- *This is a factual question and the answer can be directly derived from the lines: In his influential interpretation The Trial of Socrates (1988), the US journalist-turned-classicist I F Stone saw this trial as an embattled democracy defending itself. In Stone's view, Socrates had helped to justify the junta's savage programme of oligarchic misrule and was a traitor. Remember, this is an extremely easy question and you should not have gotten this wrong at any cost.*

QNo:- 4 ,Correct Answer:- *53214*

Explanation:-
The first pair that you need to identify in this question is: 532 (this three sentences form a perfect pair as 5 starts with the topic of change, 3 introduces "buzz words" and 2 provides us that word). 4 concludes the sequence.

QNo:- 5 ,Correct Answer:- *41523*

Explanation:-
The first pair of sentences that you need to identify is 15 as the two are linked by the common sentiment of the heroic description of news anchors. The next pair that you should identify is 23, which links the films made on journalists.

QNo:- 6 ,Correct Answer:- *2*

Explanation:-
In the given case, statements 3-1-4 form the set of connected statements. These statements talk about the dream of destruction of capitalism and how the left foresaw the situation. Statement 2 introduces the author's view which does not co-relate with any of the other statements. This makes it the odd one out in the given case.

QNo:- 7 ,Correct Answer:- *3*

Explanation:- *The paragraph talks about artists and how they are perceived by people. Statement 3 talks about the amateur and professional which though related to the same topic does not go with the other three sentences.*

QNo:- 8 ,Correct Answer:- *A*

Explanation:- *In the given case, the author of the passage adopts a reverent (feeling or showing profound respect) towards Alex Cockburn. It is clear from the passage that he adopts a positive attitude towards him and only one option exhibits the same positive approach.*

QNo:- 9 ,Correct Answer:- *B*

Explanation:- *Let us have a look at the meanings of the given words:*
1. Epigram: A witty saying
2. Eulogy: A formal expression of praise for someone who has died recently
3. Epistolary: Written in the form of or carried on by letters or correspondence
4. Epithet: A defamatory or abusive word or phrase

We can see that option 2 is the clearly the best answer in the given case.

QNo:- 10 ,Correct Answer:- *C*

Explanation:- *The answer to this question can be derived from the lines: Mind you, I agreed more often than not, because he had that rare and precious ability to cut through the cant of politicians and the high-minded."*

We can see that option 3 is the correct answer in the given case.

QNo:- 11 ,Correct Answer:- *C*

Explanation:- *We can clearly see that the given usage of the word is a negative one. From the given options, we can see that option 3 is the only one that highlights the negative usage of the word and therefore, is the correct option in the given context.*

QNo:- 12 ,Correct Answer:- *D*

Explanation:- *The answer can be derived from the portions highlighted:* ***He was comparable to Christopher Hitchens****, with whom he was for a long time a friend, before Hitchens came out in favour of the Iraq war.* ***They were both good, but I always thought Alex the better writer, because Hitchens played to the gallery and was a show-off, while Alex didn't and wasn't. Cancer has killed them both****, and both met it bravely by all accounts, but* ***it was in character that Hitchens played out his long and painful last months very publicly, while Alex, though, like Hitchens, writing to the very end, chose, it seems, to keep his condition from even friends and colleagues.***

QNo:- 13 ,Correct Answer:- *D*

Explanation:- *The idiom 'play to the gallery' means 'to spend time doing or saying things that will make people admire or support you, instead of dealing with more important matters'. This helps us identify option 4 as the correct answer.*

QNo:- 14 ,Correct Answer:- *635124*

Explanation:-
This is a tricky question which poses the additional problem of effectively 8 sentences being a part of the problem. The biggest clues in this question are statements A and H, which are fixed in their location and provides two direct clues. Statement 6 follows statement A as statement 6 set's up the example for Prisoner's Dilemma. The rest of the statements then go on to explain what happens in this Dilemma. Statement 4 directly links up with statement H as it explains what ' always act like an untrusting jerk' in the given situation .

QNo:- 15 ,Correct Answer:- *2*

Explanation:-
In the given case, statements 3-1-4 form the set of connected statements. Statement 3 provides the generic introduction and then statements 1 and 4 provide further details for the same. Statement 2 is the odd one out as the definition of "liberal education" does not fit the given context of the other statements.

QNo:- 16 ,Correct Answer:- *D*

Explanation:- *Refer to the lines: the power of the State, that timeless champion of all political and social iniquity.*
The author refers to the State as a supporter of iniquity (which means immoral or grossly unfair behaviour). This makes option 4 the correct answer in this case.

QNo:- 17 ,Correct Answer:- *D*

Explanation:- *The author of the passage clearly displays a very negative and depressing outlook in the passage. He is portraying an extremely negative situation and exhibiting his negative perception of the same situation. This makes option 4 the best answer in the given case.*

QNo:- 18 ,Correct Answer:- *A*

Explanation:- *Remember, you need to identify the primary cause in this case. The primary cause is science. Science is the tool used by military and the State to maintain its dominance over others.*

QNo:- 19 ,Correct Answer:- *25314*

Explanation:-
In 5, also a precondition for admission tells you that this sentence follows 2, which is telling you the eligibility criteria for EU membership.
The step referred to in 3 is the abolition of the death penalty mentioned in 5. Thus, 253 are a pair.The idea mentioned in 1 is followed by 4. Hence, 1 & 4 are a pair.
Hence the sequence is 25314

QNo:- 20 ,Correct Answer:- *2*

Explanation:-
In the given question, there is a very important line that you need to focus on: Not many lord chancellors of England have denounced private property, advocated a form of communism and described the current social order as a 'conspiracy of the rich'. In this line, the author highlights his surprise that someone rich and powerful is critical ofthe rich. This sentiment is best expressed and captured by option 2.

QNo:- 21 ,Correct Answer:- *C*

Explanation:-
In the given passage, the author of the passage is simply focused on one question: is there a relationship between science and morality? Are scientists different from others in terms of morality? The author explores this questions and raises some pertinent points (in the form of questions) about the same. Options 1 and 2 are outcomes that are not reached in the passage. Option 4 is irrelevant as the author is not stipulating others to think about the same issue. Option 3 is the apt answer here as it explores the correct relationship and states what the author is trying to achieve through the passage.

QNo:- 22 ,Correct Answer:- *C*

Explanation:-
Option 3 is actually an incorrect statement. Refer to the lines: Some ways of understanding it do lead to the glib dismissal, but other ways powerfully link science to moral matters.
The authors uses the word 'some', he does say that 'most' ways to understanding lead to dismissal.

Option 1 is derived from the lines: There was a time—not long ago, in historical terms—when a different "of course" prevailed: of course science can make you good. It should, and it does.
Option 2 is derived from the lines: Shifting attitudes toward this relationship between is and ought explain much of our age's characteristic uncertainty about authority: about whom to trust and what to believe.
Option 4 is derived from the lines: Why should we think that science has any special capacity for moral uplift, or that scientists—by virtue of the particular job they do, or what they know, or the way in which they know it—are morally superior to other sorts of people?

QNo:- 23 ,Correct Answer:- *A*

Explanation:-
In the given case, the concern of the author of the passage is with respect to the moral values of scientific thinking. The whole passage revolves around morality and whether being a scientist does lend one a sense of moral superiority. In this context, the best word which fits is 'virtue'. Virtue means 'the quality of doing what is right and avoiding what is wrong' and considering its meaning, we can see it is the perfect fit in the given case.

QNo:- 24 ,Correct Answer:- *D*

Explanation:-
In the given case, the answer to this question is: none of the above. Why so? Why are none of the given statements true? The reason for this is a simple one. Refer to the lines: Is a philosopher-king, or a scientist-politician, an anomaly, an absurdity, or a highly desirable state of affairs?
In these lines, the author has raised a question where he has sought the answer to the question with regards to the state of a philosopher-king or a scientist-politician. He does not provide any answers, he simply raises a question. The three statements provided to us are actually questions and since there answers are not provided, no inference can be made with respect to them.

QNo:- 25 ,Correct Answer:- *A*

Explanation:-
In this case, only option (a) is the correct answer. It can be derived from the lines: Is there something about scientists that qualifies them to intervene in social and political affairs and make decisions about all
sorts of things, including, but not confined to, the social uses of their knowledge?....Would a world governed by scientists be not only more rational but also more just?
Option (b) does not find a mention in the passage.
Option (c) distorts this statement: Are scientists recruited from a section of humankind that is already better than the norm?

QNo:- 26 ,Correct Answer:- *B*

Explanation:-
The answer can be derived from the lines: Everybody knows that the prescriptive world of ought—the moral or the good—belongs to a different domain than the descriptive world of is.
Options (a) and (c) are too generic in the given case and deviate from what is provided in the passage.

QNo:- 27 ,Correct Answer:- *25143*

Explanation:-
The paragraph is talking about the higher education and children from differing income levels.
2 is a good introductory sentence.
5 states that not always working class children also reach university which is a further thought to what is mentioned in 2.
Hence 25 is a pair.

QNo:- 28 ,Correct Answer:- *4*

Explanation:- *The two close answer options in this case are options 1 and 4.*
Options 2 and 3 are clearly irrelevant in this case and are twist the context of the given paragraph.
Option 1 is too harsh in its nature and only focuses on the negative aspect. The author does wish to highlight how the term exhaustion has been abused but option1 is too extreme in nature and therefore, ruled out. Option 4, on the other hand, does a balanced job of representing the given condition.

QNo:- 29 ,Correct Answer:- *C*

Explanation:-
In the given passage, the author expresses a clear approval of the Western civilization over the oriental one. He clearly regards the Western one as superior and this sentiment is best reflected by option 3 (a cut above means superior). The author does not state that the Western civilization rules over or dominates the oriental one and this helps us rule out the other options (which imply this sentiment in one way or the other)

QNo:- 30 ,Correct Answer:- *C*

Explanation:-
Refer to these lines: Among Oriental people the idea of progress was wanting in their philosophy. True, they had some notion of changes that take place in the conditions of political and social life, and in individual accomplishments, yet there was nothing hopeful in their presentation of the theory of life or in their practices of religion; and ***the few philosophers who recognized changes that were taking place saw not in them a persistent progress and growth. ….If at any time a ray of light penetrated the gloom, it was turned to illuminate the accumulated philosophies of the past.***
The portions in bold highlight the answer in the given case. These showcase that the issue was that the Orient was focused on the past and in the wrong direction, thereby not progressing along the right path. This sentiment is best reflected by option 3. It was not a question of their wisdom or acumen, they were just looking in the wrong direction.

QNo:- 31 ,Correct Answer:- *C*

Explanation:-
The answer to this question can be found in lines: ***In ancient times humanitarian spirit appeared not in the heart of man nor in the philosophy of government.*** *Even the old tribal government was for the few. The national government was for selected citizens only.* ***Specific gods, a special religion, the privilege of rights and duties were available to a few, while all others were deprived of them. This invoked a selfishness in practical life and developed a selfish system even among the leaders of ancient culture.*** *The broad principle of the rights of an individual because he was human, was not taken into serious consideration even among the more thoughtful.*
Option 1 is ruled out as no specific reference to the orient is made.
Option 2 is ruled out as the non-selfish goals of man are not mentioned.
Option 4 is ruled out as no case by case/contextual application is provided.

QNo:- 32 ,Correct Answer:- *B*

Explanation:-
*Refer to the lines: Civilization is a continuous movement—**hence there is a gradual transition from the Oriental civilization to the Western. The former finally merges into the latter.** Although the line of demarcation is not clearly drawn, some striking differences are apparent when the two are placed in juxtaposition.*
The correct answer in this case is option 2. The word coalescing means merging/ growing together, fusing. Options 1 and 4 simply use the word juxtapose in order to confuse you but if you look closely, these options do not make sense. Option 3 is incorrect as the passage does not state that the two move towards each other.

QNo:- 33 ,Correct Answer:- *A*

Explanation:-
Refer to the following lines: Civilization is a continuous movement—hence there is a gradual transition from the Oriental civilization to the Western. The former finally merges into the latter. Although the line of demarcation is not clearly drawn, some striking differences are apparent when the two are placed in juxtaposition.
The word 'juxtaposition' means 'the act of positioning close together (or side by side)'. We can see that option (a) is the correct answer here.

QNo:- 34 ,Correct Answer:- *B*

Explanation:-
Refer to the lines: Another great distinction in the development of European civilization was the recognition of humanity. In ancient times humanitarian spirit appeared not in the heart of man nor in the philosophy of government. Even the old tribal government was for the few.
It is clear that the words humanity and humanitarian are different in nature. In the given case, humanity did not have a humanitarian spirit to it. This makes option b the correct answer here.

QNo:- 35 ,Correct Answer:- *A*

Explanation:- *To minimize the total number of students, we will maximise the number of students who went to all 4 stalls. But 4th column of the table shows there are students who went to only one stall. Number of such students = 100 + 40 + 30 + 20 = 190.*
On selfie stall, 50 + 110 + 90 = 250 students went. But 100 went to selfie stall only.
So, remaining 250 - 100 = 150 students went to one more stall. So, we can say,

Â	Number of students who went to at least one more stall
Selfie	150
Puppet	160
Snack	120
Tattoo	150

As the maximum value in the above table is 160, so we can assume that the students who visited other stalls are among these 160 students. So the minimum number of students who attended the festival = 160 + 190 = 350.
OR
To minimize the number of students we will maximise the number of students who went to all 4 stall. But 4th column of the table shows there are students who went to only are stall. No. of such student = 100 + 40 + 30 + 20 = 190 = x (say)
On selfie stall, 50 + 110 + 90 = 250 students went. But 100 went to selfie stall only.
So, remaining 250 - 100 = 150 students went to one more stall. So, we can say,
Â

Â	No. of students who went to at least one more stall
Selfie	150
Puppet	160
Snack	120
Tattoo	150

Â
We can assume 120 = y (say) students went to all stalls. (exactly 4 stall)
From the remaining, 20 = z (say) students went to exactly 3 stalls & 20 = (w, say)¦¦¦¦¦¦¦. 2. So, minimum = x + y + z + w = 190 + 120 + 20 + 20 = 350.Â

QNo:- 36 ,Correct Answer:- *C*

Explanation:- *To minimize the total number of students, we will maximise the number of students who went to all 4 stalls. But 4th column of the table shows there are students who went to only one stall. Number of such students = 100 + 40 + 30 + 20 = 190.*
On selfie stall, 50 + 110 + 90 = 250 students went. But 100 went to selfie stall only.
So, remaining 250 - 100 = 150 students went to one more stall. So, we can say,

	Number of students who went to at least one more stall
Selfie	150
Puppet	160
Snack	120
Tattoo	150

In the above table, the minimum value is 120. So we can say that these 120 students may have visited all the four stalls.

QNo:- 37 ,Correct Answer:- *D*

Explanation:-
To find the required number of students of age not more than 6 years, who attended the festival, we will assume that the 50 students who were more than 6 years of age would be the ones who went to exactly one stall. So the remaining 50 students who went top exactly one stall were of age 6 years. It means that 110 + 90 " 50 = 150 students who went to selfie stall must have gone to some other stall. Similarly there are 160 students who went to Puppet stall must have gone to some other stall. The similar values for the next two stalls are 110 and 140 respectively. So the number of students of age not more than 6 years = 160 + 60 = 220.

OR

Age 6. We want to minimize number of student in this category. So, we have to assume that a maximum number of students in this age group went to all the 4 stalls.
From the given data it is obvious that of required age group, at least 50 must go to selfie stall & at least 10 must go to puppet stall. Now we have to maximize the number of students who goes to all four stalls. i.e. 110. Now from the remaining people, maximum number of who goes to students exactly 3 stalls = 20 & exactly, 2 stalls = 10 + 20 = 30. Total students = 50 + 10 + 110 + 20 + 20 + 10 = 220.

QNo:- 38 ,Correct Answer:- *D*

Explanation:- *Required value will be maximum when students go to exactly 2 stalls.*

$$\text{Required value} = \frac{2\,50 + 200 + 150 + 170 - 190}{2} = 290$$

QNo:- 39 ,Correct Answer:- *18*

Explanation:-
Let the number of red cards and black cards in the 1st pile be x and 3x
Let the number of black cards and red cards in the 2nd pile be y and 3y
Let the number of red cards and black cards in the 3rd pile be z and 2z
Now, we get 2 equations
3x + y + 2z = 26.....(i)
x + 3y + z = 26.....(ii)
Subtracting (ii) from (i),
z = 2(y – x)
Putting in equation (ii)
x + 3y + 2y – 2x = 26
5y – x =26
There is only one solution to this equation for which z is positive:
x = 4, y = 6 and z = 4

In 1st pile Red = 4 and Black = 12
In 2nd pile Red = 18 and Black = 6
In 3rd pile Red = 4 and Black = 8
So required answer = 18

QNo:- 40 ,Correct Answer:- *1*

Explanation:-
LCM of 2, 3 and 15 is 30. Since no date after 30 days is given in the choices, so answer has to be a multiple of 30 which happens to be 90th day out of the given choices. Thus he will buy all fruits on the 90^{th} day after 16^{th} June 2007, which is 14^{th} September 2007.

QNo:- 41 ,Correct Answer:- *2*

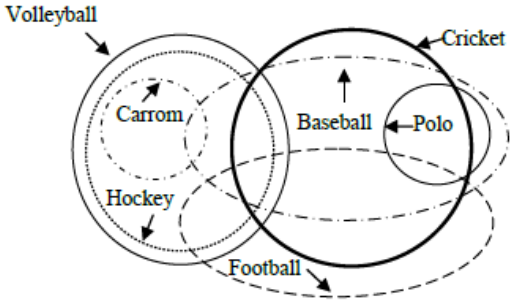
Explanation:-
LCM of 5, 7 and 9 is 315. Thus he will buy all the 3 flowers again on the 315^{th} day after 16^{th} June which is 26^{th} April 2008.

QNo:- 42 ,Correct Answer:- *4*

Explanation:-
LCM of 2, 3, 5 and 7 is 210. Thus he will buy all the 4 given things again on 210^{th} day after 16^{th} June which is 12^{th} January 2008.

QNo:- 43 ,Correct Answer:- *A*

Explanation:- *One possible configuration is as follows:*
Also, intersection of any two regions may not have any numbers.



Hockey circle contains whole Carrom circle, if Ravi is in circle of hockey it doesn't mean Ravi is also inside the carrom circle. He may or may not be inside the carrom circle.
Hockey circle passes through basketball, Football and Cricket but one cannot be sure whether Ravi likes Basket ball, Football or Cricket because some parts of Hockey circle are outside of these circles too. Hence, [I].
Alternatively.
The region denoting Hockey intersects the regions; Cricket, Basketball and- Football. Also, it contains carrom. But it is not necessary that Ravi may play, any/all of these games. Hence, [1],

QNo:- 44 ,Correct Answer:- *C*

Explanation:- *Hockey circle can passes through all the circles except polo circle. So, Amod doesn't enjoy Polo. Hence, [3].*

QNo:- 45 ,Correct Answer:- *A*

Explanation:- *All those who like polo enjoy Basketball, and some people who like Basketball may not enjoy Cricket. Therefore, definitely there may be some people who like Polo and Basketball but don't like Cricket. Hence, l.*
Alternatively,
From the figure, it is clear that [3] is the correct statement.
Also, it is not necessary that Sheetal should like Cricket. Polo region intersects Football region. ˜ She may or may not enjoys Football. Hence, [1].

QNo:- 46 ,Correct Answer:- *C*

Explanation:- *Refer to the diagram-Basket ball circle may overlap with carrom. Polo people don't like Volleyball. There is an overlap between Cricket and Hockey circle. There are people who like Hockey but dislike Football as per diagram of non overlapping part of Hockey and Football circle. Hence, [3],*

QNo:- 47 ,Correct Answer:- *B*

Explanation:-
Each month has 20 working days. The remuneration from ABC Inc. is 4 × 20 × 2500 = Rs. 200,000 while the remuneration from PQR Inc. is 5 × 20 × 2000 = Rs. 200,000. Since his income over the 5-month period is Rs. 400,000, the average income is 400000/5 = Rs. 80,000.

QNo:- 48 ,Correct Answer:- *C*

Explanation:-
At the earlier rates, Harinarayan would have earned a total of Rs. 4500 per day from both organizations together. So, his income for 2 months would have been 2 × 20 × 4500 = Rs. 180,000. In April, he trains at PQR Inc. for 7 hours in the first 2 weeks and for 3 hours in the next 2 weeks. In other words, he trains the employees 10hours per day for 2 weeks and gives them assignments for 10 hours per day for 2 weeks. Similarly, in May, he trains the employees of PQR Inc. 10 hours per day for 2 weeks and gives them assignments for 10 hours per day for 2 weeks. So, his remuneration from PQR Inc. for April and May together would be (20 × 10 × 400) + (20 × 10 × 150) = 200 × (400 + 150) = Rs. 110,000. Similarly, his remuneration for April and May from ABC Inc. would be 200 × (300 + 100) = Rs. 80,000. So, his total remuneration would be Rs. 190,000. Thus be would earn Rs. 10,000 more at the new rates as compared to the earlier rates.

QNo:- 49 ,Correct Answer:- *A*

Explanation:-
Each month, he spends an effective of 10 hours per day for 2 weeks in Training and another 10 hours per day for 2 weeks on Assignments. So, the remuneration from ABC Inc. for 4 months will be (10 × 10 × 4) × (300 + 100) = Rs. 160,000. Similarly, the remuneration from PQR Inc. will be (10 × 10 × 5) × (400 + 150) = Rs. 275,000. So, his total income for 5 months is Rs. 435,000 and the average income is Rs. 87,000.

QNo:- 50 ,Correct Answer:- *D*

Explanation:-
From statement I, we can infer that N is of the form 72x - 3. Since 1000 ≤ N ≤ 9999, we can have multiple values of N. So statement I alone is not sufficient to answer the question.
From statement II, we know that N is of the form 7y. Since 1000 ≤ N ≤ 9999, we can have multiple values of N. So statement II alone is not sufficient to answer the question.
Even if we combine the two statements, N will have multiple 4-digit values.
Thus, even the two statements togerher are not sufficient to answer the question.

QNo:- 51 ,Correct Answer:- *132*

Explanation:-
It is given that 114 students passed out of 6^{th} year in the year 2014 - 15. As there were 135 students in the 6^{th} year, it means that 21 students failed in that year. Now these 21 students would have stayed in the same year in 2015 - 16. In 2015 - 16, as there were 147 students in the 6^{th} year, it means that 147 - 21 = 126 students who were in the 5^{th} year in 2014 - 15 passed and got promoted to the 6^{th} year.
Three students in the 5^{th} year in 2014 - 15 failed and as there were 138 students in the 5^{th} year in 2015 - 16, it means 138 - 3 = 135 students who were in 4^{th} year in 2014 - 15 passed and got promoted. Similarly we can find the corresponding values for each year.

Year	Students passed	Students failed
1^{st}	117	9
2^{nd}	102	6
3^{rd}	144	6
4^{th}	135	6
5^{th}	126	3
6^{th}	114	21

As 9 students in 1^{st} year failed in the year 2014 - 15 and as there were 141 students in the college in 2015 - 16, a total of 141 - 9 = 132 students joined the college in 2015 - 16.

QNo:- 52 ,Correct Answer:- *3*

Explanation:-

It is given that 114 students passed out of 6^{th} year in the year 2014 - 15. As there were 135 students in the 6^{th} year, it means that 21 students failed in that year. Now these 21 students would have stayed in the same year in 2015 - 16. In 2015 - 16, as there were 147 students in the 6^{th} year, it means that 147 - 21 = 126 students who were in the 5^{th} year in 2014 - 15 passed and got promoted to the 6^{th} year.

Three students in the 5^{th} year in 2014 - 15 failed and as there were 138 students in the 5^{th} year in 2015 - 16, it means 138 - 3 = 135 students who were in 4^{th} year in 2014 - 15 passed and got promoted. Similarly we can find the corresponding values for each year.

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1^{st}	117	9
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4^{th}	135	6
5^{th}	126	3
6^{th}	114	21

Exactly six students failed in 2^{nd}, 3^{rd} and 4^{th} years i.e., 3 years.

QNo:- 53 ,Correct Answer:- *51*

Explanation:-

It is given that 114 students passed out of 6^{th} year in the year 2014 - 15. As there were 135 students in the 6^{th} year, it means that 21 students failed in that year. Now these 21 students would have stayed in the same year in 2015 - 16. In 2015 - 16, as there were 147 students in the 6^{th} year, it means that 147 - 21 = 126 students who were in the 5^{th} year in 2014 - 15 passed and got promoted to the 6^{th} year.

Three students in the 5^{th} year in 2014 - 15 failed and as there were 138 students in the 5^{th} year in 2015 - 16, it means 138 - 3 = 135 students who were in 4^{th} year in 2014 - 15 passed and got promoted. Similarly we can find the corresponding values for each year.

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5^{th}	126	3
6^{th}	114	21

The total number of students who failed in the year 2014 - 16 was 9 + 6 + 6 + 6 + 3 + 21 = 51.

QNo:- 54 ,Correct Answer:- *5*

Explanation:-
Total marks in college A by the five persons = (64 + 56 + 48)/75 × 100 = 224. Similarly, total marks in college B, C, D and E are 250, 200, 156 and 200 respectively. (Q + S) in A = 25% of 224 = 56.
But the maximum score of any of the two must be less than 48 (the least value of the top three). Similarly the values for B, C, D and E are 50, 25, 26 and 30 respectively.

All the five persons can have the deviation value of 50 or more as shown in the table (which is one of the possibilities).

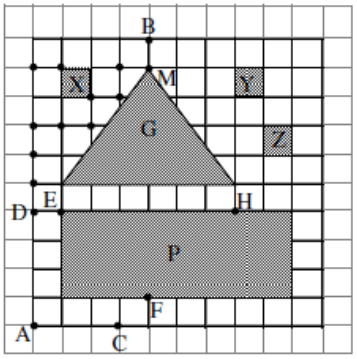
	P	Q	R	S	T	Total
A	64	46	56	10	48	224
B	10	86	60	54	40	250
C	59	55	15	61	10	200
D	48	25	42	1	40	156
E	29	54	1	50	66	200

QNo:- 55 ,Correct Answer:- *B*

Explanation:-
Starting from A and going straight up and then right to B is 14 km.
This seems to be the most obvious answer.
However, a person could walk straight up from A and take a right turn to reach the corner of the garden near point E, then walk along the garden to reach the corner of the garden M and then walk straight up to reach point B.
From the figure, if we drop a perpendicular from point M to the base of the triangular garden, we will get a (3, 4, 5) triangle.
In this case, the minimum distance from point A to point B will be 6 + 5 + 1 = 12 km.

QNo:- 56 ,Correct Answer:- *D*

Explanation:-



Since the paths along the garden cannot be walked upon, the minimum distance from A to be will be 14 km. This distance can be covered by moving up 10 km and right 4 km.
A person has a choice of moving up or moving right at each of the additional points (un-labelled points) shown in the figure above.
Each such choice will result in a different path.
It is easy to verify that the total number of paths will be greater than 6.

QNo:- 57 ,Correct Answer:- *A*

Explanation:-
Referring to the previous solutions, we know that if a person walks along the garden, he would save 2 km.
However, the 5 km that he would have to walk along the garden would cost him a total of Rs. 5 more as compared to walking 5 km along the road.
So, though he saves the Rs. 4 that he would have to pay if he walks a total of 14 km, he would end up paying an additional Rs. 5 if he walks along the garden.
If the person decides to use the boat, then the total distance travelled would definitely be more than 14 km. So, in order to minimise his cost, the person should walk 14 km by road.
Thus the minimum cost incurred in travelling from A to B would be 14 - 2.25 = Rs. 31.50.

QNo:- 58 ,Correct Answer:- *C*

Explanation:-
Scores are 75, 50, 30, 80, 25, 90 respectively in Maths.
$\text{Average score} = \frac{350}{6} \approx 60.$

QNo:- 59 ,Correct Answer:- *C*

Explanation:-

As per the given information, the ages of all children were integral squares; i.e. they are in the form of x^2 .
Hence, as the maximum sum of ages of any two siblings is 32:
$a^2 + b^2 = 32$
The only combination possible is 4^2 & 4^2, i.e. both the siblings are twins (age 16)
Hence, the age of Mr. Bhuvnesh's children is 16 years (twins)

Father	Son	Daughter	Age (Son)	Age (Daughter)	Total Age
Mr. Avinash					
Mr. Bhuvnesh			16	16	32
Mr. Chatur					
Mr. Devansh					

As, Harsh & Lovely are the siblings having lowest total age of 13 years:
Hence, the possible combination: $a^2 + b^2 = 13$
The only combination possible is 2^2 & 3^2 ;
Harsh/Lovely (siblings') ages can be 4/9 or 9/4 years.
As, the eldest boy is 25 years (5^2) and the maximum total is 32 (which is for Mr. Bhuvnesh's children), this means that his sister is 4 years old.Harsh is 4 years old and his sister is 9 years old. Therefore, we can say that 4^{th} girl is 25 years old and her brother is either 1 years old or 4 years old.
Possible combinations of the ages (brother, sister) are
CASE-1 (4,9), (16,16), (25,4) ,(1,25)
CASE-2 (4,9), (16,16), (25,4), (4,25)
As son of Mr. Avinash was younger than Mr. Bhuvnesh's daughter but older than the son of Mr. Devansh. So Mr. Avinash's son age is <16 and more than the age of Mr. Devansh's son.
Therefore, CASE-2 is eliminated. So Mr. Avinash's son age is 4 years old and Mr. Devansh's son's is 1 year old

The following table can be formed:

Father	Son	Daughter	Age (Son)	Age (Daughter)	Total Age
Mr. Avinash	Harsh	Lovely	4	9	13
Mr. Bhuvnesh	Gopal/Farukh	Kamini/Jyoti	16	16	32
Mr. Chatur	Farukh/ Gopal	Jyoti/ Kamini	25	4	29
Mr. Devansh	Eklavya	Ishita	1	25	26

Maximum possible age difference is between the ages of Eklavya and Ishita i.e. 24 years. So Eklavya is 1 year old and Ishita is 25 years old. Sum of the ages of Harsh and Lovely is 13 years so, Harsh is 4 years old and Lovely is 9 years old.
Hence Mr. Avinash is father of Lovely.

QNo:- 60 ,Correct Answer:- *B*

Explanation:-

As per the given information, the ages of all children were integral squares; i.e. they are in the form of x^2 .
Hence, as the maximum sum of ages of any two siblings is 32:
$a^2 + b^2 = 32$
The only combination possible is 4^2 & 4^2, i.e. both the siblings are twins (age 16)
Hence, the age of Mr. Bhuvnesh's children is 16 years (twins)

Father	Son	Daughter	Age (Son)	Age (Daughter)	Total Age
Mr. Avinash					
Mr. Bhuvnesh			16	16	32
Mr. Chatur					
Mr. Devansh					

As, Harsh & Lovely are the siblings having lowest total age of 13 years:
Hence, the possible combination: $a^2 + b^2 = 13$
The only combination possible is 2^2 & 3^2 ;
Harsh/Lovely (siblings') ages can be 4/9 or 9/4 years.
As, the eldest boy is 25 years (5^2) and the maximum total is 32 (which is for Mr. Bhuvnesh's children), this means that his sister is 4 years old.Harsh is 4 years old and his sister is 9 years old. Therefore, we can say that 4^{th} girl is 25 years old and her brother is either 1 years old or 4 years old.
Possible combinations of the ages (brother, sister) are
CASE-1 (4,9), (16,16), (25,4) ,(1,25)
CASE-2 (4,9), (16,16), (25,4), (4,25)
As son of Mr. Avinash was younger than Mr. Bhuvnesh's daughter but older than the son of Mr. Devansh. So Mr. Avinash's son age is <16 and more than the age of Mr. Devansh's son.
Therefore, CASE-2 is eliminated. So Mr. Avinash's son age is 4 years old and Mr. Devansh's son's is 1 year old

The following table can be formed:

Father	Son	Daughter	Age (Son)	Age (Daughter)	Total Age
Mr. Avinash	Harsh	Lovely	4	9	13
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Mr. Chatur	Farukh/ Gopal	Jyoti/ Kamini	25	4	29
Mr. Devansh	Eklavya	Ishita	1	25	26

Maximum possible age difference is between the ages of Eklavya and Ishita i.e. 24 years. So Eklavya is 1 year old and Ishita is 25 years old. Sum of the ages of Harsh and Lovely is 13 years so, Harsh is 4 years old and Lovely is 9 years old.
If the son of Mr. Bhuvnesh marries the daughter of Mr. Avinash i.e. Lovely, then Lovely is the daughter-in-law of Mr. Bhuvnesh.

QNo:- 61 ,Correct Answer:- *D*

Explanation:-

As per the given information, the ages of all children were integral squaresÍ¾ i.e. they are in the form of x^2 .
Hence, as the maximum sum of ages of any two siblings is 32:
$a^2 + b^2 = 32$
The only combination possible is 4^2 *&* 4^2*, i.e. both the siblings are twins (age 16)*
Hence, the age of Mr. Bhuvnesh's children is 16 years (twins)

Father	Son	Daughter	Age (Son)	Age (Daughter)	Total Age
Mr. Avinash					
Mr. Bhuvnesh			16	16	32
Mr. Chatur					
Mr. Devansh					

As, Harsh & Lovely are the siblings having lowest total age of 13 years:
Hence, the possible combination: $a^2 + b^2 = 13$
The only combination possible is 2^2 *&* 3^2 *Í¾*
Harsh/Lovely (siblings') ages can be 4/9 or 9/4 years.
As, the eldest boy is 25 years (5^2*) and the maximum total is 32 (which is for Mr. Bhuvnesh's children), this means that his sister is 4 years old.Harsh is 4 years old and his sister is 9 years old. Therefore, we can say that* 4^{th} *girl is 25 years old and her brother is either 1 years old or 4 years old.*
Possible combinations of the ages (brother, sister) are
CASE-1 (4,9), (16,16), (25,4) ,(1,25)
CASE-2 (4,9), (16,16), (25,4), (4,25)
As son of Mr. Avinash was younger than Mr. Bhuvnesh's daughter but older than the son of Mr. Devansh. So Mr. Avinash's son age is <16 and more than the age of Mr. Devansh's son.
Therefore, CASE-2 is eliminated. So Mr. Avinash's son age is 4 years old and Mr. Devansh's son's is 1 year old

The following table can be formed:

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Mr. Chatur	Farukh/ Gopal	Jyoti/ Kamini	25	4	29
Mr. Devansh	Eklavya	Ishita	1	25	26

Maximum possible age difference is between the ages of Eklavya and Ishita i.e. 24 years. So Eklavya is 1 year old and Ishita is 25 years old. Sum of the ages of Harsh and Lovely is 13 years so, Harsh is 4 years old and Lovely is 9 years old.
Hence if Gopal & Kamini are twins then Mr. Bhuvnesh is the father of Gopal & Kamini. Hence, Mr. Chatur is the father of Farukh and Jyoti.

QNo:- 62 ,Correct Answer:- *A*

Explanation:-

As per the given information, the ages of all children were integral squares; i.e. they are in the form of x^2 .
Hence, as the maximum sum of ages of any two siblings is 32:
$a^2 + b^2 = 32$
The only combination possible is 4^2 & 4^2, i.e. both the siblings are twins (age 16)
Hence, the age of Mr. Bhuvnesh's children is 16 years (twins)

Father	Son	Daughter	Age (Son)	Age (Daughter)	Total Age
Mr. Avinash					
Mr. Bhuvnesh			16	16	32
Mr. Chatur					
Mr. Devansh					

As, Harsh & Lovely are the siblings having lowest total age of 13 years:
Hence, the possible combination: $a^2 + b^2 = 13$
The only combination possible is 2^2 & 3^2 ;
Harsh/Lovely (siblings') ages can be 4/9 or 9/4 years.
As, the eldest boy is 25 years (5^2) and the maximum total is 32 (which is for Mr. Bhuvnesh's children), this means that his sister is 4 years old.Harsh is 4 years old and his sister is 9 years old. Therefore, we can say that 4^{th} girl is 25 years old and her brother is either 1 years old or 4 years old.
Possible combinations of the ages (brother, sister) are
CASE-1 (4,9), (16,16), (25,4) ,(1,25)
CASE-2 (4,9), (16,16), (25,4), (4,25)
As son of Mr. Avinash was younger than Mr. Bhuvnesh's daughter but older than the son of Mr. Devansh. So Mr. Avinash's son age is <16 and more than the age of Mr. Devansh's son.
Therefore, CASE-2 is eliminated. So Mr. Avinash's son age is 4 years old and Mr. Devansh's son's is 1 year old

The following table can be formed:

Father	Son	Daughter	Age (Son)	Age (Daughter)	Total Age
Mr. Avinash	Harsh	Lovely	4	9	13
Mr. Bhuvnesh	Gopal/Farukh	Kamini/Jyoti	16	16	32
Mr. Chatur	Farukh/ Gopal	Jyoti/ Kamini	25	4	29
Mr. Devansh	Eklavya	Ishita	1	25	26

Maximum possible age difference is between the ages of Eklavya and Ishita i.e. 24 years. So Eklavya is 1 year old and Ishita is 25 years old. Sum of the ages of Harsh and Lovely is 13 years so, Harsh is 4 years old and Lovely is 9 years old.

Son of Mr. Chatur is the eldest boy at the party.

QNo:- 63 ,Correct Answer:- *D*

Explanation:-
From the given information, we know that Amol, Shashi, Mandar and Reena received the video game, perfume, calculator and sunglasses respectively. This means that Piyu received the sweater and we can then conclude that she gifted the jacket.
Since Mandar did not gift an electronic item, he could have gifted the fountain pen, the shirt or the jacket.
But we know that the shirt and the jacket were gifted by Amol and Piyu respectively.
So Mandar must have gifted the fountain pen.
We still need to figure out who gifted the cell phone and the I-Pod. Since we know that Shashi did not gift the I-Pod, Reena must have gifted the I-Pod and Shashi must have gifted the cell phone.
We can now match the friend's name with the gift given and the gift received as follows:

Friends name	*Gift given*	*Gift received*
Amol	*Shirt*	*Video Game*
Mandar	*Fountain Pen*	*Calculator*
Piyu	*Jacket*	*Sweater*
Shashi	*Cell Phone*	*Perfume*
Reena	*I-Pod*	*Sunglasses*

Thus, Piyu gifted the jacket.

QNo:- 64 ,Correct Answer:- *A*

Explanation:-
From the given information, we know that Amol, Shashi, Mandar and Reena received the video game, perfume, calculator and sunglasses respectively. This means that Piyu received the sweater and we can then conclude that she gifted the jacket.
Since Mandar did not gift an electronic item, he could have gifted the fountain pen, the shirt or the jacket.
But we know that the shirt and the jacket were gifted by Amol and Piyu respectively.
So Mandar must have gifted the fountain pen.
We still need to figure out who gifted the cell phone and the I-Pod. Since we know that Shashi did not gift the I-Pod, Reena must have gifted the I-Pod and Shashi must have gifted the cell phone.
We can now match the friend's name with the gift given and the gift received as follows:

Friends name	*Gift given*	*Gift received*
Amol	*Shirt*	*Video Game*
Mandar	*Fountain Pen*	*Calculator*
Piyu	*Jacket*	*Sweater*
Shashi	*Cell Phone*	*Perfume*
Reena	*I-Pod*	*Sunglasses*

Thus, it can be concluded that Amol and Mandar gifted the shirt and the fountain pen respectively (non-electronic items) and received the video game and the calculator respectively (electronic items).

QNo:- 65 ,Correct Answer:- *C*

Explanation:-
From the given information, we know that Amol, Shashi, Mandar and Reena received the video game, perfume, calculator and sunglasses respectively. This means that Piyu received the sweater and we can then conclude that she gifted the jacket.
Since Mandar did not gift an electronic item, he could have gifted the fountain pen, the shirt or the jacket.
But we know that the shirt and the jacket were gifted by Amol and Piyu respectively.
So Mandar must have gifted the fountain pen.
We still need to figure out who gifted the cell phone and the I-Pod. Since we know that Shashi did not gift the I-Pod, Reena must have gifted the I-Pod and Shashi must have gifted the cell phone.
We can now match the friend's name with the gift given and the gift received as follows:

Friends name	*Gift given*	*Gift received*
Amol	*Shirt*	*Video Game*
Mandar	*Fountain Pen*	*Calculator*
Piyu	*Jacket*	*Sweater*
Shashi	*Cell Phone*	*Perfume*
Reena	*I-Pod*	*Sunglasses*

Thus, it can be verified that Reena gifted the I-Pod and received the pair of sunglasses in return.

QNo:- 66 ,Correct Answer:- *C*

Explanation:-
From the given information, we know that Amol, Shashi, Mandar and Reena received the video game, perfume, calculator and sunglasses respectively. This means that Piyu received the sweater and we can then conclude that she gifted the jacket.
Since Mandar did not gift an electronic item, he could have gifted the fountain pen, the shirt or the jacket.
But we know that the shirt and the jacket were gifted by Amol and Piyu respectively.
So Mandar must have gifted the fountain pen.
We still need to figure out who gifted the cell phone and the I-Pod. Since we know that Shashi did not gift the I-Pod, Reena must have gifted the I-Pod and Shashi must have gifted the cell phone.
We can now match the friend's name with the gift given and the gift received as follows:

Friends name	*Gift given*	*Gift received*
Amol	*Shirt*	*Video Game*
Mandar	*Fountain Pen*	*Calculator*
Piyu	*Jacket*	*Sweater*
Shashi	*Cell Phone*	*Perfume*
Reena	*I-Pod*	*Sunglasses*

Only Amol and Mandar received electronic items. So option 1 is true.
Shashi gifted the cell phone and received the perfume. So option 2 is true.
Reena gifted the I-Pod and in alphabetical order, she would appear second last. So option 3 is false.
In alphabetical order, Piyu appears in the middle and she gifted the jacket and received the sweater in return. So option 4 is true.
Hence, the correct answer is option (3).

QNo:- 67 ,Correct Answer:- *C*

Explanation:-
*The 2 litres given to Shamu contain milk and water in the ratio 9:1, i.e., 1.8 litres of milk and 0.2 litres of water. The remaining 18 litres contains 16.2 litres of milk and 1.8 litres of water. After adding tap water, the ratio of milk to water becomes 9:10. the quantity of tap water is 16.2*10/9 = 18 litres. Since the mixture already has 18 litres, the total quantity now becomes 36 litres. The total revenue is 36*50 + 2*50 (already sold) = 1900. The total cost is 900 + (2*15) = Rs. 930. Thus his profit is 1900 - 930 = Rs. 970 => (970/930) - 100 = 104%.*

QNo:- 68 ,Correct Answer:- *D*

Explanation:-

Alloy 1	Copper	Aluminum
	2x	3x
Alloy 2	Copper	Zinc
	2y	7y

If Aluminum and Zinc have to be equal, 3x = 7y. The simplest case occurs at the LCM, when both Aluminum and Zinc are 21kg.

Alloy 1	Copper	Aluminum
	14	21
Alloy 2	Copper	Zinc
	6	21

Even a gram of alloy 1 above this level would mean that there is more Aluminum than Zinc in the total alloy. So, this table is a limit on the percentages of different metals.
The percentage of Copper in the total alloy would be (14 + 6) - (100/62) = 32.25%
On the other hand, if we want more Aluminum than Zinc, we can use tons and tons of alloy 1, and only a microgram of Alloy 2. The quantity of alloy 2 can be made so small that its presence can be almost neglected, as it will have as good as zero impact on the overall percentage of copper. This is another extreme case, in which Copper will have 40% weight in the alloy 2/(2+3).
Thus, the percentage of Copper ranges between 32.25% to 40% in this alloy.

QNo:- 69 ,Correct Answer:- *C*

Explanation:-

Let the number of students in the class be n
Total age = $n \times 2n = 2n^2$
When X leaves, the total age = $(n-1) \times 2(n-1) = 2(n-1)^2$
X's age = $2n^2 - 2(n-1)^2$
When Y leaves the total age = $(n-2) \times 2(n-2) = 2(n-2)^2$
Y's age = $2(n-1)^2 - 2(n-2)^2$
Therefore, Ratio of ages of X and Y

$$\Rightarrow \frac{2n^2 - 2(n-1)^2}{2(n-1)^2 - 2(n-2)^2} = \frac{19}{17}$$

$$\Rightarrow \frac{n^2 - (n^2 - 2n + 1)}{(n^2 - 2n + 1) - (n^2 - 4n + 4)} = \frac{19}{17}$$

$$\Rightarrow \frac{2n-1}{2n-3} = \frac{19}{17} \Rightarrow n = 10$$

When Z leaves, total age = $2(n-2)^2 - 16 = 2(8)^2 - 16 = 112$
Average age = 112/7 = 16.

QNo:- 70 ,Correct Answer:- *B*

Explanation:-

a, b and c are the root of the equation $x^3 - x^2 - 1 = 0$
$a^3 - a^2 - 1 = 0$, $b^3 - b^2 - 1 = 0$ *and*
$c^3 - c^2 - 1 = 0$
And, sum of the roots $= a + b + c = -(-1/1) = 1$ *Now,* $f(x) = x^5 - x^4 - x^2 - x$
$f(a) = a^5 - a^4 - a^2 - a$
$f(a) = a^2(a^3 - a^2 - 1) - a$
$f(a) = a^2(0) - a = -a$
Similarly, $f(b) = -b$ *and* $f(c) = -c$
$f(a) + f(b) + f(c) = -(a + b + c) = -(1) = -1$.
Hence, option 2.

QNo:- 71 ,Correct Answer:- *A*

Explanation:- *(a) If (x,y) is a pair of integers that satisfies the inequality, then (−x,−y) is also such a pair, since* $(-x)^2 + (-x)(-y) + (-y)^2 = x^2 + xy + y^2$.
So we can match up pairs of solutions to the inequality, $(x,y) \leftrightarrow (-x,-y)$. *Every solution will be paired with a different solution, except for the one remaining solution (0,0) which is paired with itself. This shows that the number of solutions is odd.*

QNo:- 72 ,Correct Answer:- *20*

Explanation:-

Number of girls should be 1.5 times the number of boys. When 50% of the boys are taken as girls, let the number of boys = x
Number of girls = 1.5x
Total number of students = 2.5x

Original number of boys = 2x (50% of boys = x)
Original number of girls = 0.5x

Girls form 20% of the overall class.

QNo:- 73 ,Correct Answer:- *B*

Explanation:-

Given $2a^2+17b^2+8c^2-6ab-20bc=0$

Now, the above expression, on the L.H.S. resembles the sum of two expressions of the form $(ma+nb)^2$ *and* $(pb+qc)^2$*, where m,n,p and q are some constants. By a little trial and error , it can be seen that by multiplying the entire equation with 2, it is possible to easily arrive at a set of m, n, p and q*

$\therefore 4a^2+34b^2+16c^2-12ab-40bc=0$

$\Rightarrow (2a-3b)^2+(5b-4c)^2=0 \ldots..(2)$

$\Rightarrow a=\frac{3}{2}b \text{ and } c=\frac{5b}{4}$

(Because the only way equation (2) can be true is if each term on the L.H.S individually , equals zero)

Now $\frac{a+b-c}{a+b+c}$ can be found as $\frac{\left(\frac{3}{2}b\right)+b-\left(\frac{5}{4}b\right)}{\left(\frac{3}{2}b\right)+b+\left(\frac{5}{4}b\right)}=\frac{6+4-5}{6+4+5}=\frac{5}{15}=\frac{1}{3}.$

QNo:- 74 ,Correct Answer:- *A*

Explanation:-

$a + b + c = 25$
$\Rightarrow c = 25 - (a + b)$
$ab + bc + ca = 75$
$\Rightarrow ab + (b+a)\, c = 75$
$\Rightarrow ab + (a+b)\,[25 - (a+b)] = 75$
$\Rightarrow ab + 25a + 25b - a^2 - b^2 - 2ab = 75$
$\Rightarrow b^2 + (a - 25)\, b + (75 + a^2 - 25a) = 0$
As b is real
$(a - 25)^2 - 4(1)\,(a^2 - 25a + 75) \geq 0$
$\Rightarrow a^2 - 50a + 625 - 4a^2 + 100a - 300 \geq 0$
$\Rightarrow -3a^2 + 50a + 325 \geq 0$
$\Rightarrow -3a^2 + 65a - 15a + 325 \geq 0$
$\Rightarrow (-3a + 65)\,(a+5) \geq 0$
$-3a + 65 \leq 0$ *and* $a + 5 \leq 0$
$\Rightarrow a \geq 65/3$ *and* $a \leq -5$
Which is not possible
$\therefore -3a + 65 \geq 0$ *and* $a + 5 \geq 0$
$\Rightarrow a \leq 65/3$ *and* $a \geq -5$
The maximum value that a can have is 65/3.

QNo:- 75 ,Correct Answer:- *D*

Explanation:- *Since xy = 54; ab = 54. Since ka and ℓb have HCF = LCF = 18*

$ka=18;\ \ell b=18 \Rightarrow a,b \text{ can be } (6,9)(3,18) \therefore \frac{a}{b} \text{ or } \frac{b}{a} \text{ can be } \frac{6}{9}, \frac{9}{6}, \frac{3}{18}, \frac{18}{3}$

QNo:- 76 ,Correct Answer:- *810810*

Explanation:-
In order to reach his office, the man must walk 7 blocks east (E) and 8 blocks north (N). He can choose any east-north pattern. The problem is then reduced to arranging the 7 Es and the 8 Ns. The 7 Es can be arranged in $^{15}C_7$ *= 6435 different ways. The 8 Ns can now be arranged in 1 way. After this, the man must walk 5 blocks west and 4 blocks south in order to reach the supermarket. Using the same logic, the number of ways he can do this is* $^{9}C_5$ *= 126 . Thus, the number of different routes he can choose to reach the supermarket is 6435 × 126 = 810,810.*

QNo:- 77 ,Correct Answer:- *A*

Explanation:-
Lets find out for which value of n we get a number just above 1000 in the expression n(n + 1)/2 i.e. sum of page number of book. For n = 45 it is 1035, and 35 is the sum of two consecutive numbers i.e. 17 and 18. Hence page numbers which are torn are 17 and 18.

QNo:- 78 ,Correct Answer:- *C*

Explanation:-
The difference p – q is highest when A, B and C are numbers that are just short of whole numbers.
For example, let A = B = C = 0.9.
Thus, p = MOD (0.9 + 0.9 + 0.9) = MOD (2.7) = 2
q = MOD (0.9) + MOD (0.9) + MOD (0.9) = 0 + 0 + 0 = 0
Hence, the maximum value of p – q is 2.

QNo:- 79 ,Correct Answer:- *B*

Explanation:-
3-digit multiples of 3 range from 3 × 34 = 102 to 3 × 333 = 999. So, there are 333 – 33 = 300 such multiples and their sum is (300/2)(102 + 999) = 165150. 3-digit multiples of 5 range from 5 × 20 = 100 to 5 × 199 = 995. So, there are 199 – 19 = 180 such multiples and their sum is (180/2)(100 + 995) = 98550.Multiples of 15 will be common to both sets. 3-digit multiples of 15 range from 15 × 7 = 105 to 15 × 66 = 990. So, there are 66 – 6 = 60 such multiples and their sum is (60/2)(105 + 990) = 32850.Thus the sum of all 3-digit multiples of 3 or 5 is 165150 + 98550 – 32850 = 230,850.

QNo:- 80 ,Correct Answer:- *0*

Explanation:-
*The last two digits of the sum of all integers will depend on the sums of the last two digits of the integers. If the last digit is 0, the remaining digits can be chosen in 6 * 5 * 4 * 3 = 360 ways. So, there are 360 integers ending in a 0. The ten's digit of these 360 integers will be 1, 2, 3, 5, 6 or 8, each appearing 60 times. If these 360 integers are added, the unit's digit will be 0 and the ten's digits will add up to (1 + 2 + 3 + 5 + 6 + 8) * 60 = 1500.*
*If the last digit is not 0, the last digit can be chosen in 6 ways and the remaining digits can be chosen in 5 * 5 * 4 * 3 = 300 ways. So there are 300 * 6 = 1800 such integers. 300 each of these will end in 1, 2, 3, 5, 6 and 8 respectively. The sum of all these unit's digits will be (1 + 2 + 3 + 5 + 6 + 8) * 300 = 7500. Consider the 300 integers ending in 1. Of these, 60 integers will have 0 in the ten's place and 48 each will have 2, 3, 5, 6 and 8 in the ten's place. This logic can be extended to the other integers ending in 2, 3, 5, 6 and 8. So the sum of the digits in the ten's places will be (1 + 2 + 3 + 5 + 6 + 8) * 5 * 48 = 6000. Combining all of these, the sum of the digits in the unit's places will be 7500 and the sum of the digits in the ten's places will be (1500 + 6000) = 7500. The unit's place of the sum will be 0 and the 750 is carried over to 7500 to make the total 8250 ⇒ Ten's digit is also 0.*
Thus the sum of the last two digits of the integers will be 0.

QNo:- 81 ,Correct Answer:- *C*

Explanation:-
Let 8p + 1 = k (k + 1)/2, so 16 p + 2 = k (k + 1)
Therefore 16 p = k^2 + k – 2 = (k – 1)(k + 2).
If k – 1 is odd, then k + 2 will be even, and vice versa. In other words, only one of these factors is even, and so it must be a multiple of 16.
As k – 1 and k + 2 differ by 3, we can write 16p = 16m(16m ± 3), leading to p = m(16m ± 3).
Now, m = 1, otherwise we would be dealing with a composite number, and p = 13 or p = 19.
When p = 13, 8p + 1 = 105 = t_{14} and when p = 19, 8p + 1 = 153 = t_{17}.

QNo:- 82 ,Correct Answer:- *B*

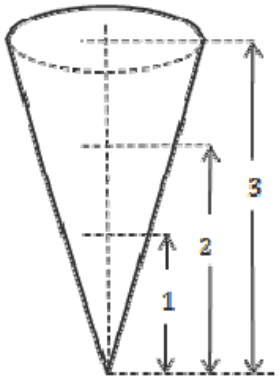
Explanation:-
Let Spike's speed be x, then {7.5/ (x – 15) } – {6/ (x – 12) } = 1.5
Solving we get x = 18 km/hr

QNo:- 83 ,Correct Answer:- *C*

Explanation:- *In 60 s, a vehicle traveling at 30 kmph covers 500 m.*
In 50 s, a vehicle traveling at 30 kmph covers 417 m.
So she covers 83 m in 50 s.
Or 83 × 3600/50 m = 5976 m in one hour = 6 km/hr.

QNo:- 84 ,Correct Answer:- *B*

Explanation:-



Refer the diagram, The ratio of volumes of cones up to height 1 m, 2 m and 3 m = $1^3 : 2^3 : 3^3 = 1 : 8 : 27$. The ratio of volumes of water in the tank above 2 m, between 2 m and 1 m, and below 1 m
$= (27 – 8) : (8 – 1) : 1 = 19 : 7 : 1$
Since the total volume of water in the tank is 27 L, therefore the volume of the water above 2 m, between 2 m and 1 m, and below 1 m is 19 L, 7 L and 1 L respectively.
When the water level is above 2 m height, all the three taps contribute to empty the tank, but when water level is between 2 m and 1 m, only 2 taps contribute, and when the water level is below 1 m, only 1 tap contribute to empty the tank.
Total time required to empty the tank = 19/3 + 7/2 + 1/1 = 65/6 =11 min
The tank will be empty after approximately 11 min past 12, i.e. at 12:11 pm.
Hence, option 2.

QNo:- 85 ,Correct Answer:- *9704*

Explanation:- $t_1=2$ & $t_n - t_{n-1}=2(n-1)$ for $n \geq 2$

put $n=2, t_2 - t_1 = 2\times1$

$n=3, t_3-t_2 = 2\times2$

$n=4, t_4-t_3 = 2\times3$

$n=99, t_{99}-t_{98}=2\times98$

Add all equation, $t_{99}-t_1=2(1+2+\ldots+98)$

$t_{99} = 2+2(\sum 98) = 2 + 2(4851)$

$=9704$ Ans.

QNo:- 86 ,Correct Answer:- *D*

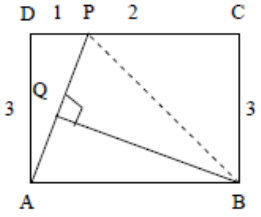
Explanation:-

The volume of the water can be calculated as the volume of the cylinder less the volume of the conical shape left. After scooping out the hemisphere, the volume of the conical shape is $^1/_3\pi \times 4 \times 5 - {}^2/_3\pi = 6\pi$. The volume of the cylinder is $\pi \times 9 \times 10 = 90\pi$. So the volume of the water is 84π.

QNo:- 87 ,Correct Answer:- *D*

Explanation:-

The diagram of the question is as follows:



Now for simplicity take the side of square = 3

$\text{ar(APD)}=\frac{1}{2}\times3\times1=\frac{3}{2}$

$\text{ar (BCP)}=\frac{1}{2}\times3\times2=3$

$\text{ar (ABP)}=9-3-\frac{3}{2}$ or $\frac{1}{2}\times3\times3=\frac{9}{2}$

$\text{AP}=\sqrt{9+1}=\sqrt{10}$

$\therefore \text{BQ}=\frac{\text{ar(ABP)}}{\frac{1}{2}\text{AP}}=\frac{\frac{9}{2}}{\frac{1}{2}\sqrt{10}}=\frac{9}{\sqrt{10}}$

$\text{AQ}=\sqrt{9-\left(\frac{9}{10}\right)^2}=\frac{3}{\sqrt{10}}$

$\text{Ar(PQBC)}=9-\frac{3}{2}-\frac{1}{2}\cdot\frac{3}{\sqrt{10}}\cdot\frac{9}{\sqrt{10}}=9-\frac{3}{2}-\frac{27}{20}=\frac{180-30-27}{20}=\frac{123}{20}$

$\text{Req. Ratio}=\frac{\frac{123}{20}}{9}=\frac{123}{20}\times\frac{1}{9}=\frac{41}{60}$

QNo:- 88 ,Correct Answer:- *C*

Explanation:-
The diameter of Akhilesh's house is the same as the plot size.
So we can say that Akhilesh's plot is 10 m × 10 m.
Since Manoj's plot is double the area of Akhilesh, so his plot size would be 10√2 m × 10√2 m
Now Manoj's house is a cube, so the basic house shape will also have a height of 10√2 m.

Take a cross section of the roof, and you get a right triangle whose height is the roof height.
Its base will be 10√2/2 = 5√2 m and the slant height of 9 m is its hypotenuse.
Using Pythagora's theorem, we get the height as $\sqrt{(9^2 - (5\sqrt{2})^2)} = \sqrt{31}$ *m*

The house height is 10√2 + √31 m.

QNo:- 89 ,Correct Answer:- *2*

Explanation:-
The 3 successive discounts are a%, b% and c%, where a + b + c = 50%
The maximum discount(x%), would occur when a=50%, b = c = 0%
In this case, selling price=1080. Profit% = 8%
The minimum discount would result when $a=b=c=\frac{50}{3}\%$

$\therefore$ Selling price $=\left(\frac{5}{6}\right)\left(\frac{5}{6}\right)\left(\frac{5}{6}\right)2160=1250 \Rightarrow$ Profit%=25%

There two cases are represented below.

Minimum Selling Price 1080	Maximum Selling Price 1250
Minimum Profit percentage 8%	Maximum Profit Percentage 25%

Consider the ranges given in the choices:
(i) 6 < x < 10 contains values which are not possible for x.
(ii) 14 < x < 20 contains only those values which are possible.
(iii) 20 < x < 24 contains only those values which are possible
(iv) 25 < x < 26 contains values which are not possible for x.

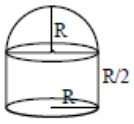
˜ 2 of the ranges contains values which are not possible for x.

QNo:- 90 ,Correct Answer:- *A*

Explanation:- *The ratio of volumes of the two cones is given as 8:1. The radius of the darker one is 1 ft while that of the brighter one is ½ ft. The total distance given is 10 ft. If the altitude of the darker one is x, then the altitude of the brighter one will be 10 – x. Thus,*
$(1/3\ \pi\ r_1^2 h_1) / (1/3\ \pi\ r_2^2 h_2) = 8/1$
Or $4x / (10 - x) = 8/1$
Or $x = 20/3 = 6.67$ *ft*

QNo:- 91 ,Correct Answer:- *C*

Explanation:-



Suppose the radius is R. Then the height of the hemispherical part is also R. Since the height of the cylindrical part is ¼ the diameter, the height must be 2R/4 = R/2. The volume of the digester equals the sum of the volumes of the cylinder and the hemispheres, i.e., $\pi R^2(R/2) + (2/3)\pi R^3 = 792 \Rightarrow \pi R^3 \times (7/6) = 792$. Solving this equation gives R = 6 ft.

The area of the plot is 28.8 × 15.7 = 452.16 sq. ft. The area of the plot surrounding the digester is 452.16 - 36p = 452.16 – 113.14 = 339.02 sq. ft. The earth dug out is spread over this area and consequently the height of ground level will increase. Since the total height of the digester is 9 ft., we want a depth of 3 ft. Suppose the ground is dug to a depth of H ft. The volume of the earth dug out is 36πH. This earth is spread over 339.12 sq. ft. so that the height of ground level rises by (3 – H) ft. Since the volume of the earth dug out is constant, we get, 36πH = 339.12 (3 – H) ⇒ 113.14H = 1017.36 – 339.02H ⇒ 452.16H = 1017.36 ⇒ H = 2.25. So, we need to dig to a depth of 2.25 ft. so that after spreading the earth over the remainder of the plot, we attain a depth of 3 ft. Thus, Ravi has to dig up to a depth which is (2.25/9) × 100 = 25% of the total height of the digester.

QNo:- 92 ,Correct Answer:- *50000*

Explanation:-

CP of shopkeeper = SP of shopkeeper = 45000/-

$$\text{CP of shopkeeper} = \frac{45000}{90} \times 100 = 50000/-$$

Now, CP of shopkeeper = SP of wholesaler = 50000/-

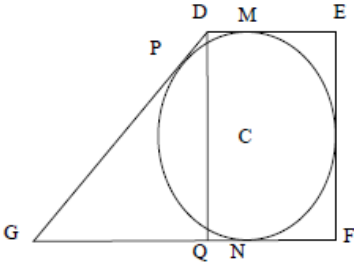
$$\text{CP of wholesaler} = \frac{50000}{125} \times 100 = 40000/-$$

CP of wholesaler = SP of manufacturer = 40000/-

$$\text{Thus, CP of manufacturer} = \frac{40000}{80} \times 100 = 50000/-$$

QNo:- 93 ,Correct Answer:- *A*

Explanation:-



Drop DQ ⊥ GN.

Let, the radius of circle be x cm.

$\therefore$ CM = CN = x

Given that GN = 4 cm

$\therefore$ GP = 4 cm

Also, DP = DM = QN = 1 cm

$\therefore$ GD = 5 cm

GQ = GM – QN = 4 – 1 = 3 cm

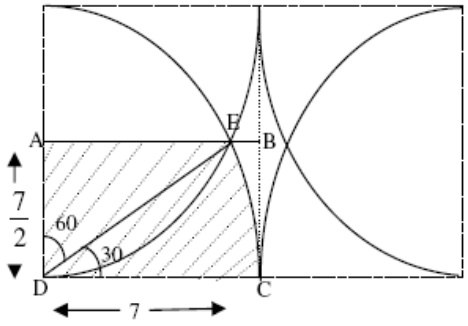
In Δ DGQ, DQ = $\sqrt{GD^2 - GQ^2} = 4$cm

$\Rightarrow 2x = 4$ cm ($\because$ DQ = MN)

$\therefore x = 2$ cm

QNo:- 94 ,Correct Answer:- *C*

Explanation:-



Let us look at only one of the halves – because by symmetry the same shall apply to the other half.
We have a square of side 7cm. So area = 49cm^2. In fact let us concentrate on an area which is half of this square i.e. the rectangle ABCD (= 24.5 cm^2). This is occupied by a sector EDC of arc length 30° and a triangle AED of base 3.5 cm and height where the sector cuts the edge i.e at point E.
Height AE = 7 cos 30 = $7\sqrt{3}/2$. So the unshaded area of the rectangle ABCD will be equal to area of rectangle – area of the sector – area of the triangle = $24.5 - 22/7 \times 1/12 \times 49 - 1/2 \times 3.5 \times 7\sqrt{3}/2 = 49/2 - 22 \times 1/12 \times 7 - 49\sqrt{3}/8 = 7\ (7/2 - 11/6 - 7\sqrt{3}/8)$
$= 7(3.5 - 1.83 - 1.5) = 1.19$.
So total area not covered will be $4 \times 1.19 = 4.76$.

QNo:- 95 ,Correct Answer:- *D*

Explanation:-

$$A = \sqrt{10^{\left[2+\frac{1}{2}\log_{10} 16\right]}}$$

$$= \sqrt{10^{[\log_{10} 100+\log_{10} 4]}} = \sqrt{10^{[\log_{10} 400]}} = \sqrt{400} = 20.$$

QNo:- 96 ,Correct Answer:- *3*

Explanation:-

$S = \frac{2}{5}+\frac{6}{25}+\frac{12}{125}+\frac{20}{625}+\frac{30}{3125}+...$

Now, $\frac{S}{5}=\frac{2}{25}+\frac{6}{125}+\frac{12}{625}+\frac{20}{3125}+.....$

$\Rightarrow S-\frac{S}{5}=\frac{4S}{5}=\frac{2}{5}+\frac{4}{25}+\frac{6}{125}+\frac{8}{625}+\frac{10}{3125}+...$

Now, $\frac{4S}{25}=\frac{2}{25}+\frac{4}{125}+\frac{6}{625}+\frac{8}{3125}+...$

So, $\frac{4S}{5}-\frac{4S}{25}=\frac{16S}{25}=\frac{2}{5}+\frac{2}{25}+\frac{2}{125}+\frac{2}{625}+\frac{2}{3125}+...$

This is a GP with $a = 2/5$ and $r = 1/5$. The sum of this GP is $\frac{\frac{2}{5}}{\left(1-\frac{1}{5}\right)}=\frac{\frac{2}{5}}{\frac{4}{5}}=\frac{1}{2}$.

Thus, $\frac{16S}{25}=\frac{1}{2} \Rightarrow S=\frac{25}{32}$.

QNo:- 97 ,Correct Answer:- *B*

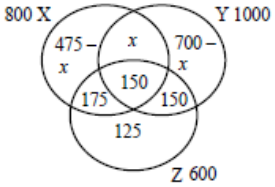
Explanation:-

The sum of the present ages of the 4 members in the family is 18.5 × 4 = 74. Since the sum of the present ages of the husband and wife is 6.4 times the sum of the present ages of their children, the sum of the ages of the husband and wife must be 64 while the sum of the ages of the children must be 10. Since one child is 2 years older than the other one, the present ages of the children are 4 and 6. Since the 2nd child was born 4 years ago, the sum of the ages of the husband and wife then was 64 – 8 = 56. Since the 2nd child was born 6 years after marriage, the sum of the ages of the husband and wife when they got married was 56 – 12 = 44 and their ages were in the ratio 6 : 5 ⇒ their ages were 24 and 20. When the 2nd child was born, their ages had increased by 6 years each, i.e., their ages were 30 and 26. Thus the required ratio is 15 : 13.

QNo:- 98 ,Correct Answer:- *B*

Explanation:-

From the given information, we can draw the Venn diagram as follows:



So the total number of share holders is $600 + 700 - x + x + 475 - x = 1775 - x$

The minimum and maximum values of x are 0 and 475 respectively.

So the maximum and minimum number of share holders is 1775 and 1300 respectively.

The required difference is 475.

QNo:- 99 ,Correct Answer:- *B*

Explanation:-

$R=\frac{7500\times100}{25000\times3}=10\%$

$A=25000\left(1+\frac{10}{100}\right)^3 = 33275$; So CI=33275-25000=Rs.8275

QNo:- 100 ,Correct Answer:- *D*

Explanation:-

From the given information, we have $\frac{1}{A}+\frac{1}{C}=\frac{1}{12}$, $\frac{1}{C}+\frac{1}{D}=\frac{1}{24}$, $\frac{1}{B}+\frac{1}{D}=\frac{13}{200}$ and $\frac{4}{A}+\frac{5}{B}+\frac{14}{C}+\frac{12}{D}=1$. The last equation can be rewritten as $4\left(\frac{1}{A}+\frac{1}{C}\right)+10\left(\frac{1}{C}+\frac{1}{D}\right)+2\left(\frac{1}{B}+\frac{1}{D}\right)+3\frac{1}{B}=1$. Solving these equations yields A = 15 days, B = 25 days, C = 60 days and D = 40 days.

So, in 1 day, the 4 of them will complete $\frac{1}{15}+\frac{1}{25}+\frac{1}{60}+\frac{1}{40}=\frac{89}{600}$ of the work.

Thus they will take 600/89 = $6\ ^{66}/_{89}$ days to finish the job.