

Answers:

VARC	LRDI	Quant
1.A	27.D	51.A
2.D	28.A	52.4
3.D	29.D	53.B
4.B	30.B	54.90000
5.C	31.9	55.A
6.C	32.11	56.B
7.D	33.D	57.315
8.A	34.C	58.A
9.A	35.C	59.800
10.A	36.C	60.C
11.A	37.2	61.C
12.A	38.9	62.B
13.C	39.6	63.C
14.A	40.6	64.B
15.A	41.A	65.10
16.B	42.D	66.A
17.D	43.B	67.A
18.A	44.D	68.17

19.B	45.C	69.D
20.A	46.B	70.D
21.2	47.D	71.A
22.2413	48.D	72.23
23.D	49.C	73.A
24.4	50.D	74.D
25.2143		75.D
26.1342		76.2704

Explanations:

VARC

1. A

Let's look at the options one by one.

Option B is "Images are meaningful visual experiences when they have a foundation of covenants seeing them." This is a distorted option. The actual statement states that sight becomes a meaning visual experience when images are associated with covenants. There is nowhere any discussion about the meaningfulness of images.

Option C is "Sight as a meaningful visual experience is possible when there is a foundational condition established in images of covenants." Again a twisted option. There is nothing said about the possibility of sight as a visual experience. There could be other cases too in which meaningful visual experience could be established.

Option D is "The way we experience sight is through images operated on by meaningful covenants." Entirely out of context option. The statement is about meaningful visual experience not about meaningful covenants.



Option A correctly encapsulates all the points. Hence it is the correct answer.

2. D

Option D states "studying visual culture requires institutional structures without which the structures of perception cannot be analysed".

Look at the penultimate paragraph of the question, "Vision is a socially and a biologically constructed operation, depending on the design of the human body and how it engages the interpretive devices developed by a culture in order to see intelligibly"

Studying visual culture thus depends on the design of human body and interpretative devices developed by the culture. Nowhere is it mentioned that, without institutional structures of culture vision can't be analysed as it also depends on the design of human body. Hence this is a wrong inference. Remaining all three options are correct.

3. D

This is a vocab question. Epiphenomena means "a secondary effect or byproduct". The option "Phenomena supplemental to the evidence" is the closest one. Hence it is the correct answer.

4. B

Let's look at the options one by one.

Option A states that, "Socially existing beings cannot be analysed, unlike the art of Michelangelo or Leonardo which can." Twisted option. The excerpt from the passage states that "no amount of social analysis is enough for Michelangelo and Leonardo, because they were such vast artists." However other beings could be socially analysed

because not everyone is like Michelangelo or Leonardo.

Option C states that, "Michelangelo or Leonardo cannot be subjected to social analysis because of their genius." This is an entirely wrong option. These artists can be subjected to social analysis, but nothing will do justice to them.

Option D states that, "No analyses exist of Michelangelo's or Leonardo's social accounts." This is beyond the scope of the passage, as nothing has been mentioned about this.

Option B is the correct answer.

5. C

This is a fact based easy question. Read the passage carefully. Imagery can be inferred from the second paragraph. And from the subsequent paragraphs you can also infer Visual Practices, Lifeworlds and Structures of Perception (penultimate paragraph).

Hence Option C is the correct answer.

6. C

Option A states that the author is "facetious". Facetious means, treating serious issues with inappropriate humor. Author is nowhere mocking the hard life of peasants. On the contrary, he is actually admitting it and suggesting it as the reason why so many people became pirates in the first place. Hence this option is incorrect.

Option B states analytical. The author is nowhere contrasting the lives of peasant and pirates. He has not portrayed the lives of pirates in a pleasant light. Ultimately they also have to face surveillance and other dangers, thus the contrast in the option is wrong.

Indignant is completely wrong. The author is not angry at the pirates, for amassing huge wealth. Entirely out of context.

Option C talks about irony, which is actually correct. The author is ironical that an honest peasant has to toil day and night and still has to sleep empty stomach but on the other hand a pirate could easily amass twice the fortunes of peasant, without breaking much sweat. This entirely captures the essence of the mentioned line. Hence this

answer is correct.

7. D

Option B and Option C are factually out of scope. Nothing has been said about who laid the groundwork for modern piracy. Neither has any comparisons made between the piracy of today and yesteryears.

In this statement, the author is obviously not assigning any blame to Vasco Da Gama and East India company. He just wants to highlight their roles in early pirates history.

Option D can be inferred from the passage.

8. A

Look at the 4th paragraph of the passage. "It quickly becomes clear that in those parts of the world that have not profited from globalisation and modernisation, and where abject poverty and the daily struggle for survival are still a reality, the root causes of piracy are still the same as they were a couple of hundred years ago." Hence to best control the problem of piracy one has to solve this root problem that is eliminate income disparities and poverty in affected regions. Hence 1 is the correct answer. Remaining options are solution but not the one which can eliminate piracy in the long run.

9. A

The author in the passage that "surveillance is there, but they are costly and will never be enough to cover the entire sea" He nowhere mentions that surveillance has decreased, actually it is not possible to map the entire sea. Hence this option is incorrect. Remaining all the options are correct.

10. A

Look at the last paragraph of the passage," Other influential perspectives supporting a biological basis for aggression conclude that humans evolved with an abnormally low neural inhibition of aggressive impulses". While the first option talks about neural regulation of testosterone, which is factually incorrect. Hence this is the answer.

11. A

Option A can be easily inferred from the last few lines of the first paragraph. Remaining options are out of context.

12. A

Let's look at the options one by one.

Option B is a distorted option. The sentence is not about the reliability of the information. Its about the inherent aggression involved.

Option C is also incorrect. Nothing has been mentioned about when the enemy refuses to reveal information. Hence this is beyond the scope of the passage.

On similar lines option D is also incorrect. Nothing has been said about the most effective method to extract information.

Option A correctly captures the essence. Sometimes the aggressor has no intention to inflict pain, its just a means to an utilitarian end. Hence this is the correct option.



13. C

Option C is a twisted option. It distorts what is given in the passage. The passage talks about the identification of death instinct by Freud. It doesn't talk about its moderation and keeping the resulting aggression in check. Hence this option is completely out of context and is incorrect.

14. A

The last paragraph talks about how renewable energy can be produced at local or household level but it also talks about the roadblocks in terms of financing. Hence it portrays two sides of the coin, talking about both the positives and negatives. Thus we

can fairly conclude that renewable energy is a double edged sword. Option 1 is the correct answer.

15. A

Look at these lines from the first paragraph of the passage, "But renewables need to be further scrutinized before being championed as forging a path toward a low-carbon future. Both the direct and indirect impacts of renewable energy must be examined to ensure that a climate-smart future does not intensify social and environmental harm. As renewable energy production requires land, water, and labor, among other inputs, it imposes costs on people and the environment."

These lines clearly indicate that the author has reservations about the renewable energy systems.

Option (2) is factually incorrect. Option 3 is beyond the scope of the passage. No comparison has been made as such. Option (4) is partially correct. The author has reservations about profitability and various other factors too which is accurately captured by the first option.

16. B

Here we have to look at those options which if false will support the author's arguments. Look at the option 2. It states that renewable energy have little or no environmental impact. Its negation will be renewable energy have considerable environmental impact, this is what the author states throughout the passage, about the harmful impact of renewable energy. Hence option 2 is correct.

17. D

Look at the last line of the passage, "For financial growth to be sustained and expanded by the renewable sector, production and trade in renewable energy technologies will need to be highly concentrated, and large asset management firms will likely drive those developments". Nowhere it is mentioned that the negative impacts of renewable energy needs to be studied, for it to be financially viable. Hence option 4 is incorrect.

18. A

Let's look at the options one by one. Option 2 states "The study of the coexistence of marginalised people with their environments." This passage is about the impact of renewable energy on marginalized people, not about their coexistence. Hence ignore this option.

Option 3 states "Encouragement for the development of more environment-friendly carbon-based fuels". In the third paragraph, the author talks about reducing carbon footprint. Hence he will never support carbon based fuels. This option is incorrect.

Option 4 is completely negated by the last paragraph. The author talks about the financial viability of the localised small scale production. Hence this option too is incorrect.

Option 1 is completely correct."many of the world's largest reservoirs of minerals like cobalt, copper, lithium, [and] rare earth minerals"—the ones needed for renewable technologies—"are found in fragile states and under communities of marginalized peoples in Africa, Asia, and Latin America." Since the demand for metals and minerals will increase substantially in a renewable-powered future . . . this intensification could exacerbate the existing consequences of extractive activities."

This intensification could exacerbate the existing consequences, i.e. if proper disposal of toxic materials is not done it can make the conditions worse. Option 1 is the correct answer.

19. B

Let's look at the options one by one.

The author has not made any comparisons between the two methodologies, about which method is better. Hence Option A is incorrect.

Option 3 is incorrect too because it does not summarise the para accurately. Nothing is mentioned about decisions based on information.

Although time is a factor, nowhere is it mentioned that time is the factor in determining the method of our decision making. Hence Option 4 is incorrect too.

Option 2 correctly summarises the passage by differentiating between the two

methods. Hence it is correct.

20. A

Option B is incorrect, as it mentions "is no longer relevant" whereas the author says may no longer be relevant.

Option C is incorrect too, as the passage talks about distinguishing between urban/rural, not about accurately identifying rural areas.

Option D is distorted. Judgement would be required on the richer criteria, not on the objective methodology, as mentioned in this option.

Option A is correct as it correctly captures the essence of the passage.

21. 2



We notice that Statement (3) serves as an introduction by touching upon the topic of intellectual property rights. Statement (2) continues along this line and mentions how 'monopolizing and protecting data' {an idea perhaps associated with the aforementioned intellectual property rights} can be observed in certain business models. Thus, the discussion revolves around data/information and its place in the market system. Statement (5) mentions that despite the monopolization, "information is abundant". And this brings us to the description in Statement (4) which portrays information differently - as a social good. Hence, although a bit discontinuous, 3-1-5-4 seems to talk about the same subject while Statement (2) {on 'Merchant Capitalism'} diverges from it. Therefore, (2) is the odd-one-out.

22. 2413

Of all the sentences, sentence 2 will be the starting point because it introduces the

concept of nuclear fission. Sentence 4 continues this concept by talking about the "resulting ionizing radiation". Out of sentence 1 and 3, 1 will come first because it introduces the concept of atom bomb and sentence 3 further explores it by talking about how the impact of atomic energy could be much greater. Hence the correct order is 2413.

23. D

Let's look at the options one by one. Option 1 talks about voluntary surrender of rights. But the passage talks about "transfer" of rights, not "surrender" of rights.

The main point is not about "powers of papacy", option 2 is inconsequential.

Option 3 does not cover one of the main points of the passage, the transfer of rights, between people and the sovereign power. It's an incomplete option.

Option 4 is the correct summary, it talks about the transactional relationship i.e give and take or transfer of rights between people and sovereign government.

24. 4

The subject here is about the narratives of sexual assault and the subsequent treatment of the victims. The paragraph begins with Statement (5) which talks about sexual assault narratives turning into a genre. Statement (2) comments on a stark element within these narratives: the general interest in perpetrators' futures and victims' pasts. Statement (3) delineates on the outcome of the latter: the focus on a victim's past' and Statement (1) further adds to this point. Although Statement (4) appears on a similar topic, we cannot place it in the above arrangement since it diverges into the subject of asking questions to the survivors {an element that is yet to be discussed}. Thus, (4) is the odd-one-out.

25. 2143

This is a very easy parajumble question. Sentence 2 introduces the topic, VLT. Option 4 further explores it by discussing about the telescopes. 43 forms a natural block as one provides the use and other the application. Hence 2143 is the correct order.

26. 1342

1 and 3 forms a natural block, as the "It" in sentence 3 refers to the "brain" discussed in statement 1. Again 4 and 2 forms a natural block, as the "this tendency" in statement 2, refers to the tendency of the people ignoring things happening in front of their eyes as discussed in statement 4. Hence the correct order is 1342.

LRDI



27. D

From 1, Let sales amounts in the Apparel departments for Delhi and Kolkata in 2018 be a.

From 2, Let sales amounts in the Apparel departments for Mumbai and Bengaluru in 2018 and for Delhi be b.

From 3, Let the sales amounts in the Home Décor departments for Mumbai and Kolkata in 2018 be c and that of Delhi and Bengaluru be s and t respectively.

Let the Let sales amounts in the Apparel departments for Mumbai and Bengaluru in 2019 be m and n respectively.

The table looks like:

Sales Amounts (Crore Rupees)								
	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparel	a	b	b	m	b	n	a	54
Electronics	78	98	82	102	90	70	80	100
Home Décor	s	100	c	72	t	80	c	54

From 6, $s=80$ and $t=60$.

From 5, $s+c+t+c+70=306 \Rightarrow 2c=96 \Rightarrow c=48$.

From 4, $(b-a)+(m-b)+(n-b)+(54-a)=(20)+20-20+20 \Rightarrow 54+m+n-2a-b=40 \Rightarrow 2a+b=14+m+n \Rightarrow 2b=28+2m+2n-4a$... (i)

From 7, $b-a=n-b \Rightarrow 2b=a+n$... (ii) and $m-b=54-a \Rightarrow a+m=54+b \Rightarrow 2b=2a+2m-108$... (iii)

From 8, $108-b+n \Rightarrow 2b=216-2n$... (iv)

from (i) & (iii), $28+2m+2n-4a=2a+2m-108 \Rightarrow 6a=136+2n \Rightarrow 3a=68+n$... (v)

from (ii) & (iv), $216-2n=a+n \Rightarrow a+3n=216 \Rightarrow 3a=648-9n$... (vi)

from (v) & (vi), $648-9n=68+n \Rightarrow n=58 \Rightarrow a=42 \Rightarrow b=50 \Rightarrow m=62$.

The final table looks like this

Sales Amount (Crore Rupees)								
	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	42	50	50	62	50	58	42	54
Electronics	78	98	82	102	90	70	80	100
Home Decor	80	100	48	72	60	80	48	54

28. A

From 1, Let sales amounts in the Apparel departments for Delhi and Kolkata in 2018 be a.

From 2, Let sales amounts in the Apparel departments for Mumbai and Bengaluru in 2018 and for Delhi be b.

From 3, let the sales amounts in the Home Decor departments for Mumbai and Kolkata in 2018 be c and that of Delhi and Bengaluru be s and t respectively.

Let the Let sales amounts in the Apparel departments for Mumbai and Bengaluru in 2019 be m and n respectively.

The table looks like:

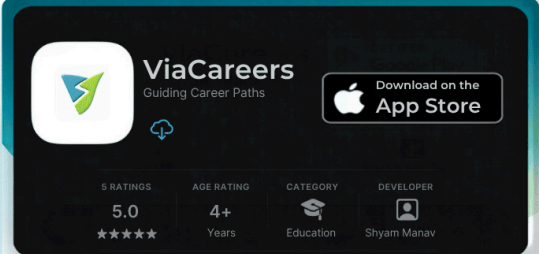
Sales Amounts (Crore Rupees)								
	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparel	a	b	b	m	b	n	a	54
Electronics	78	98	82	102	90	70	80	100
Home Décor	s	100	c	72	t	80	c	54

From 6, $s=80$ and $t=60$.

From 5, $s+c+t+c+70=306 \Rightarrow 2c=96 \Rightarrow c=48$.

From 4, $(b-a)+(m-b)+(n-b)+(54-a)=(20)+20+20+20 \Rightarrow 54+m+n-2a-b=40 \Rightarrow 2a+b=14+m+n \Rightarrow 2b=28+2m+2n-4a$... (i)

From 7, $b-a=n-b \Rightarrow 2b=a+n$... (ii) and $m-b=54-a \Rightarrow a+m=54+b \Rightarrow 2b=2a+2m-108$... (iii)



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From 8, $108-b+n \Rightarrow 2b=216-2n$... (iv)

from (i) & (iii), $28+2m+2n-4a=2a+2m-108 \Rightarrow 6a=136+2n \Rightarrow 3a=68+n$... (v)

from (ii) & (iv), $216 - 2n = a + n \Rightarrow a + 3n = 216 \Rightarrow 3a = 648 - 9n \dots$ (vi)

from (v) & (vi), $648 - 9n = 68 + n \Rightarrow n = 58 \Rightarrow a = 42 \Rightarrow b = 50 \Rightarrow m = 62$.

The final table looks like this

Sales Amount (Crore Rupees)								
	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	42	50	50	62	50	58	42	54
Electronics	78	98	82	102	90	70	80	100
Home Decor	80	100	48	72	60	80	48	54

Increase in sales = 12

29. D

From 1, Let sales amounts in the Apparel departments for Delhi and Kolkata in 2018 be a.

From 2, Let sales amounts in the Apparel departments for Mumbai and Bengaluru in 2018 and for Delhi be b.

From 3, let the sales amounts in the Home Décor departments for Mumbai and Kolkata in 2018 be c and that of Delhi and Bengaluru be s and t respectively.

Let the Let sales amounts in the Apparel departments for Mumbai and Bengaluru in 2019 be m and n respectively.

The table looks like:

Sales Amounts (Crore Rupees)								
	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparel	a	b	b	m	b	n	a	54
Electronics	78	98	82	102	90	70	80	100
Home Décor	s	100	c	72	t	80	c	54

From 6, $s=80$ and $t=60$.

From 5, $s+c+t+c+70=306 \Rightarrow 2c=96 \Rightarrow c=48$.

From 4, $(b-a)+(m-b)+(n-b)+(54-a)=(20)+20-20+20 \Rightarrow 54+m+n-2a-b=40 \Rightarrow 2a+b=14+m+n \Rightarrow 2b=28+2m+2n-4a \dots (i)$

From 7, $b-a=n-b \Rightarrow 2b=a+n \dots (ii)$ and $m-b=54-a \Rightarrow a+m=54+b \Rightarrow 2b=2a+2m-108 \dots (iii)$

From 8, $108-b+n \Rightarrow 2b=216-2n \dots (iv)$

from (i) & (iii), $28+2m+2n-4a=2a+2m-108 \Rightarrow 6a=136+2n \Rightarrow 3a=68+n \dots (v)$

from (ii) & (iv), $216-2n=a+n \Rightarrow a+3n=216 \Rightarrow 3a=648-9n \dots (vi)$



from (v) & (vi), $648 - 9n = 68 + n \Rightarrow n = 58 \Rightarrow a = 42 \Rightarrow b = 50 \Rightarrow m = 62$.

The final table looks like this

Sales Amount (Crore Rupees)								
	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	42	50	50	62	50	58	42	54
Electronics	78	98	82	102	90	70	80	100
Home Decor	80	100	48	72	60	80	48	54

Hence the percentage change is 50.

30. B

From 1, Let sales amounts in the Apparel departments for Delhi and Kolkata in 2018 be a.

From 2, Let sales amounts in the Apparel departments for Mumbai and Bengaluru in 2018 and for Delhi be b.

From 3, let the sales amounts in the Home Décor departments for Mumbai and Kolkata in 2018 be c and that of Delhi and Bengaluru be s and t respectively.

Let the Let sales amounts in the Apparel departments for Mumbai and Bengaluru in 2019 be m and n respectively.

The table looks like:

Sales Amounts (Crore Rupees)								
	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparel	a	b	b	m	b	n	a	54
Electronics	78	98	82	102	90	70	80	100
Home Décor	s	100	c	72	t	80	c	54

From 6, **s=80 and t=60.**

From 5, $s+c+t+c+70=306 \Rightarrow 2c=96 \Rightarrow \mathbf{c=48}.$

From 4, $(b-a)+(m-b)+(n-b)+(54-a)=(20)+20-20+20 \Rightarrow 54+m+n-2a-b=40 \Rightarrow 2a+b=14+m+n$
 $\Rightarrow 2b=28+2m+2n-4a...$

(i)

From 7, $b-a=n-b \Rightarrow 2b=a+n...$ (ii) and $m-b=54-a \Rightarrow a+m=54+b \Rightarrow 2b=2a+2m-108...$ (iii)

From 8, $108-b+n \Rightarrow 2b=216-2n...$ (iv)

from (i) & (iii), $28+2m+2n-4a=2a+2m-108 \Rightarrow 6a=136+2n \Rightarrow 3a=68+n...$ (v)

from (ii) & (iv), $216-2n=a+n \Rightarrow a+3n=216 \Rightarrow 3a=648-9n...$ (vi)

from (v) & (vi), $648-9n=68+n \Rightarrow \mathbf{n=58 \Rightarrow a=42 \Rightarrow b=50 \Rightarrow m=62}.$

The final table looks like this

Sales Amount (Crore Rupees)								
	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	42	50	50	62	50	58	42	54
Electronics	78	98	82	102	90	70	80	100
Home Decor	80	100	48	72	60	80	48	54

∴ total sales amount, in Crore Rupees, in 2019 for the chain of departmental stores = 900 cr.

31. 9

It's given in the question that the first runner up polled 10,000 more votes than the second runner up in constituency A. Now the first runner up has got 95000 votes, hence the second runner up will get 85000 votes.

Now the remaining votes will be $500000 - 275000 - 95000 - 85000 = 45000$

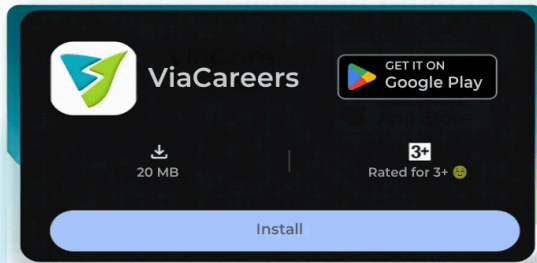
From 2, None of the candidates who contested in constituency C lost their security deposit. The difference in votes polled by any pair of candidates in this constituency was at least 10,000 $\Rightarrow$ the person who got 5th highest votes must have got $600030/6 \Rightarrow 100006$. Since it is also given that the difference of votes is ≥ 10000 , the possible case is winner, 1st runner up, 2nd runner up, 3rd runner up, 4th runner up must have got 140006, 130006, 120006, 110006, 100006 respectively which sums upto exactly 600030.

Let the number of votes polled in D be $100x$.

From 3, The winning candidate in constituency D must have got $15x + 37500$

The table now looks like:

	Constituency			
	A	B	C	D
No. of candidates contesting	10	12	5	8
Total No. of valid votes polled	5,00,000	3,25,000	6,00,030	100x
No. of votes polled by the winning candidate	2,75,000	48,750	140006	37500+5x
No. of votes polled by the first runner up	95,000		130006	37,500
No. of votes polled by the second runner up	85000		120006	30,000
% of valid votes polled by the third runner up			16.67%	10%



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32. 11

It's given in the question that the first runner up polled 10,000 more votes than the second runner up in constituency A. Now the first runner up has got 95000 votes, hence the second runner up will get 85000 votes.

Now the remaining votes will be $500000 - 275000 - 95000 - 85000 = 45000$

From 2, None of the candidates who contested in constituency C lost their security deposit. The difference in votes polled by any pair of candidates in this constituency was at least 10,000 $\Rightarrow$ the person who got 5th highest votes must have got $> 600030/6 \Rightarrow \geq 100006$. Since it is also given that the difference of votes is ≥ 10000 , the only possible case is winner, 1st runner up, 2nd runner up, 3rd runner up, 4th runner up must have got 140006, 130006, 120006, 110006, 100006

respectively which sums upto exactly 600030.

Let the number of votes polled in D be 100x.

From 3, The winning candidate in constituency D must have got $5x + 37500$

The table now looks like:

	Constituency			
	A	B	C	D
No. of candidates contesting	10	12	5	8
Total No. of valid votes polled	5,00,000	3,25,000	6,00,030	100x
No. of votes polled by the winning candidate	2,75,000	48,750	140006	37500+5x
No. of votes polled by the first runner up	95,000		130006	37,500
No. of votes polled by the second runner up	85000		120006	30,000
% of valid votes polled by the third runner up			16.67%	10%

In constituency B, the mark for not losing the security deposit is $1/6(325000)$ or 54,167. But winner himself/herself got $< 54167 \Rightarrow$ all the other candidates lost their security deposits.

11 is the correct answer.

33. D

It's given in the question that the first runner up polled 10,000 more votes than the second runner up in constituency A. Now the first runner up has got 95000 votes, hence the second runner up will get 85000 votes.

Now the remaining votes will be $500000 - 275000 - 95000 - 85000 = 45000$

From 2, None of the candidates who contested in constituency C lost their security deposit. The difference in votes polled by any pair of candidates in this constituency was at least 10,000 $\Rightarrow$ the person who got 5th highest votes must have got $> 600030/6 \Rightarrow \geq 100006$. Since it is also given that the difference of votes is $\geq$

10000, the only possible case is winner, 1st runner up, 2nd runner up, 3rd runner up, 4th runner up must have got 140006, 130006, 120006, 110006, 100006 respectively which sums upto exactly 600030.

Let the number of votes polled in D be 100x.

From 3, The winning candidate in constituency D must have got $37500 + 5x$.

The table now looks like:

	Constituency			
	A	B	C	D
No. of candidates contesting	10	12	5	8
Total No. of valid votes polled	5,00,000	3,25,000	6,00,030	100x
No. of votes polled by the winning candidate	2,75,000	48,750	140006	37500+5x
No. of votes polled by the first runner up	95,000		130006	37,500
No. of votes polled by the second runner up	85000		120006	30,000
% of valid votes polled by the third runner up			16.67%	10%

Number of votes polled to winning candidate must be 140006.

34. C

It's given in the question that the first runner up polled 10,000 more votes than the second runner up in constituency A. Now the first runner up has got 95000 votes, hence the second runner up will get 85000 votes.

Now the remaining votes will be $500000 - 275000 - 95000 - 85000 = 45000$

From 2, None of the candidates who contested in constituency C lost their security deposit. The difference in votes polled by any pair of candidates in this constituency was at least 10,000 $\Rightarrow$ the person who got 5th highest votes must have got $> 600030/6 \Rightarrow \geq 100006$. Since it is also given that the difference of votes is ≥ 10000 , the only possible case is winner, 1st runner up, 2nd runner up, 3rd runner up, 4th runner up must have got 140006, 130006, 120006, 110006, 100006 respectively which sums upto exactly 600030.

From 3, Let the total votes in D be 100x $\Rightarrow$ The winning candidate in constituency D must have got 37500+5x.

The table now looks like:

The candidates who didn't lose the deposit must have got $< 16.67\% \Rightarrow$ 3rd runner up must surely didn't get the deposit.



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	Constituency			
	A	B	C	D
No. of candidates contesting	10	12	5	8
Total No. of valid votes polled	5,00,000	3,25,000	6,00,030	100x
No. of votes polled by the winning candidate	2,75,000	48,750	140006	37500+5x
No. of votes polled by the first runner up	95,000		130006	37,500
No. of votes polled by the second runner up	85000		120006	30,000
% of valid votes polled by the third runner up			16.67%	10%

Also, the candidates who got security deposit must have got 65% of votes.

Case I:

Let top three candidates got the security deposit $\Rightarrow 37500 + 5x + 37500 + 30000 = 65x \Rightarrow x = 1750 \Rightarrow 100x = 175000$

Case II:

Let top three candidates got the security deposit $\Rightarrow 37500 + 5x + 37500 = 65x \Rightarrow 60x = 12500 \Rightarrow x = 2083.33$ but 16.66% of 125000 = 20834 $\Rightarrow$ 2nd runner up must got security deposit. So, this case is not valid.

The increasing order C will always come after D which is not happening in the third option. Hence that is the correct answer.

35. C

It's given in the question that the first runner up polled 10,000 more votes than the second runner up in constituency A. Now the first runner up has got 95000 votes, hence the second runner up will get 85000 votes.

Now the remaining votes will be $500000 - 275000 - 95000 - 85000 = 45000$

From 2, None of the candidates who contested in constituency C lost their security deposit. The difference in votes polled by any pair of candidates in this constituency was at least 10,000 $\Rightarrow$ the person who got 5th highest votes must have got $> 600030/6 \Rightarrow \geq 100006$. Since it is also given that the difference of votes is ≥ 10000 , the only possible case is winner, 1st runner up, 2nd runner up, 3rd runner up, 4th runner up must have got 140006, 130006, 120006, 110006, 100006 respectively which sums upto exactly 600030.

From 3, The winning candidate in constituency D must have got $1.05 \times 37500 = 39375$.

Let the number of votes polled in D be $100x$.

The table now looks like:

	Constituency			
	A	B	C	D
No. of candidates contesting	10	12	5	8
Total No. of valid votes polled	5,00,000	3,25,000	6,00,030	$100x$
No. of votes polled by the winning candidate	2,75,000	48,750	140006	39,375
No. of votes polled by the first runner up	95,000		130006	37,500
No. of votes polled by the second runner up	85000		120006	30,000
% of valid votes polled by the third runner up			16.67%	10%

As calculated in the previous question, candidate D got 175000 votes. The winner got 5% more votes than first runner up, hence the winner got 0.05×175000 i.e 8750 more votes than first runner up. Thus 8750 is the winning margin for constituency D.

Moreover margin in constituency is atleast 10000. Hence in the increasing order C will always come after D which is not happening in the third option. Hence that is the correct answer.

36. C

It's given in the question that the first runner up polled 10,000 more votes than the second runner up in constituency A. Now the first runner up has got 95000 votes, hence the second runner up will get 85000 votes.

Now the remaining votes will be $500000 - 275000 - 95000 - 85000 = 45000$

From 2, None of the candidates who contested in constituency C lost their security deposit. The difference in votes polled by any pair of candidates in this constituency was at least 10,000 $\Rightarrow$ the person who got 5th highest votes must have got $> 600030/6 \Rightarrow \geq 100006$. Since it is also given that the difference of votes is ≥ 10000 , the only possible case is winner, 1st runner up, 2nd runner up, 3rd runner up, 4th runner up must have got 140006, 130006, 120006, 110006, 100006 respectively which sums upto exactly 600030.

From 3, Let the total votes in D be $100x \Rightarrow$ The winning candidate in constituency D must have got $37500 + 5x$.

The table now looks like:

	Constituency			
	A	B	C	D
No. of candidates contesting	10	12	5	8
Total No. of valid votes polled	5,00,000	3,25,000	6,00,030	$100x$
No. of votes polled by the winning candidate	2,75,000	48,750	140006	$37500 + 5x$
No. of votes polled by the first runner up	95,000		130006	37,500
No. of votes polled by the second runner up	85000		120006	30,000
% of valid votes polled by the third runner up			16.67%	10%

The candidates who didn't lose the deposit must have got $< 16.67\% \Rightarrow$ 3rd runner up must surely didn't get the deposit.

Also, the candidates who got security deposit must have got 65% of votes.

Case I:



Let top three candidates got the security deposit $\Rightarrow 37500 + 5x + 37500 + 30000 = 65x \Rightarrow x = 1750 \Rightarrow 100x =$

175000

Case II:

Let top three candidates got the security deposit $\Rightarrow 37500 + 5x + 37500 = 65x \Rightarrow 60x = 1250 \Rightarrow x = 125000$ but 16.66% of $125000 = 20834 \Rightarrow$ 2nd runner up must got security deposit. So, this case is not valid.

For all the constituencies lets look at the candidates who lost their security deposit.

A $(500000 - 275000 - 95000 - 85000) = 45000$.

B $(325000 - 48750) = 276250$

C (0) and D $(61250) = 175000 - 46250 - 30000 - 37500$

Hence percentage will be $382500 / 1600000 \times 100 = 23.91\%$

37.2

G	B	G	B	G
B	G	B	G	B
G	B	G	B	G
B	G	B	G	B
G	B	G	B	G

There are only 2 configurations possible

B	G	B	G	B
G	B	G	B	G
B	G	B	G	B
G	B	G	B	G
B	G	B	G	B

38.9

R			R	
	R			R
		R		
R			R	
	R			R

Maximum 9 red beads are possible as shown here

39. 6

To solve this question we can use the answer of the previous question, since maximum 9 red beads are possible, filling the remaining space with green and blue beads, in such a way that number of blue beads is minimised

R	G	B	R	G
G	R	G	B	R
B	G	R	G	B
R	B	G	R	G
G	R	B	G	R

Hence number of blue beads is 6

40. 6

6 more beads can be placed as shown

R			R	
		R		
	R			R
R			R	
		R		

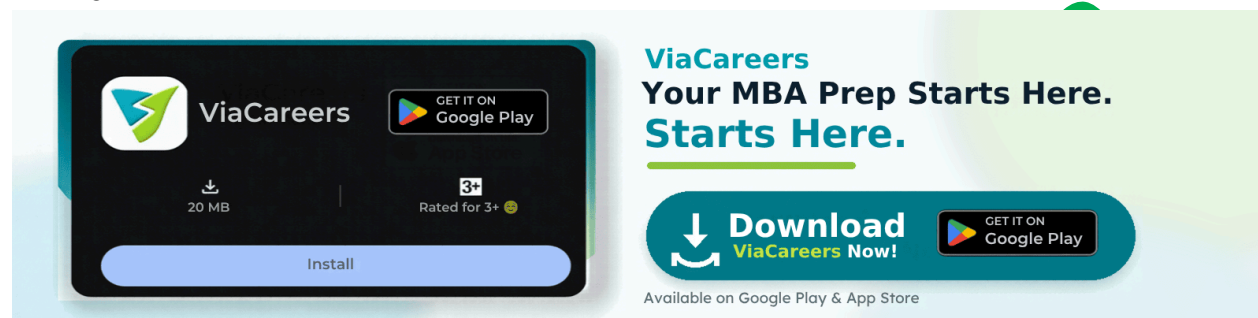
Explanation [41 – 46]:

Let's look at all the students we have A,B,C,D,E,F,G,H. The guides are P,Q,R,S,T and they mentor 2,1,2,1,2 students respectively.

Slots are 9:00,9:30,10:00,10:30. Moreover economics, sociology and anthropology have

4,3,1 students respectively.

Now from 5th statement, two sociology seminars and economics seminars are held in the same slot. This will not take place at 10:00 (only one seminar is scheduled at 10:00), this will also not take place at 10:30 (An anthropology seminar is scheduled at 10:30 and maximum three seminars are scheduled in a slot. Hence this will happen at either 9 or 9:30. Now from (7) A and G are scheduled in consecutive slots. A is scheduled at 10:00. Hence G will be scheduled at 9:30. So from (5), there will be three students having their seminars at 9:30.



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Combining this data with the remaining points we get the following table

41. A

P (2)	Sociology	B, C
Q (1)	Anthropology/ Sociology	Either F or G
R (2)	Economics	A, Either of D/ E/ H
S (1)	Sociology/ Anthropology	G/ F
T (2)	Economics	Any two of the D/ E/ H

Moreover we do know that students having same subject are scheduled in consecutive slots. So we get

09:00			09:30			10:00			10:30		
Teacher	Student	Subject	Teacher	Student	Subject	Teacher	Student	Subject	Teacher	Student	Subject
T		Economics	T		Economics	R	A	Economics	R		Economics
		Sociology		B	Sociology					F	Anthropology
				G	Sociology						

Here we can see that two seminars are scheduled in first slot.

42. D

P (2)	Sociology	B, C
Q (1)	Anthropology/ Sociology	Either F or G
R (2)	Economics	<u>A</u> , Either of D/ E/ H
S (1)	Sociology/ Anthropology	G/ F
T (2)	Economics	Any two of the D/ E/ H

Moreover we do know that students having same subject are scheduled in consecutive slots. So we get

09:00			09:30			10:00			10:30		
Teacher	Student	Subject	Teacher	Student	Subject	Teacher	Student	Subject	Teacher	Student	Subject
T		Economics	T		Economics	R	A	Economics	R		Economics
		Sociology		B	Sociology					F	Anthropology
				G	Sociology						

As we can see from the above table, PQ and S are not guiding any economics student

43. B

P (2)	Sociology	B, C
Q (1)	Anthropology/ Sociology	Either F or G
R (2)	Economics	<u>A</u> , Either of D/ E/ H
S (1)	Sociology/ Anthropology	G/ F
T (2)	Economics	Any two of the D/ E/ H

As we can clearly say from here that H/D/E are all economics students. Hence Option B is definitely correct

44. D

P (2)	Sociology	B, C
Q (1)	Anthropology/ Sociology	Either F or G
R (2)	Economics	<u>A</u> , Either of D/ E/ H
S (1)	Sociology/ Anthropology	G/ F
T (2)	Economics	Any two of the D/ E/ H

09:00			09:30			10:00			10:30		
Teacher	Student	Subject	Teacher	Student	Subject	Teacher	Student	Subject	Teacher	Student	Subject
T		Economics	T		Economics	R	A	Economics	R		Economics
		Sociology		B	Sociology					F	Anthropology
				G	Sociology						

Now D is scheduled in a slot later than Q. Q can mentor only F or G, but obviously he can't mentor F because F is in the last slot, hence Q will mentor G. In that scenario D has to take the 10:30 slot which means D will be mentored by R and E/H will be mentored by T. So statement 1 and statement 2 both are correct.

45. C

P (2)	Sociology	B, C
Q (1)	Anthropology/ Sociology	Either F or G
R (2)	Economics	<u>A</u> , Either of D/ E/ H
S (1)	Sociology/ Anthropology	G/ F
T (2)	Economics	Any two of the D/ E/ H

09:00			09:30			10:00			10:30		
Teacher	Student	Subject	Teacher	Student	Subject	Teacher	Student	Subject	Teacher	Student	Subject
T		Economics	T		Economics	R	A	Economics	R		Economics
		Sociology		B	Sociology					F	Anthropology
				G	Sociology						

If E and Q are scheduled in the same slot, they both can be in the last slot. In that case E will be guided by R and both D and H will be guided by T. Moreover if they are in the second slot, E will be guided by T and atleast one of D and H will be guided by T. Hence

option (c) is correct

46. B

P (2)	Sociology	B, C
Q (1)	Anthropology/ Sociology	Either F or G
R (2)	Economics	<u>A</u> , Either of D/ E/ H
S (1)	Sociology/ Anthropology	G/ F
T (2)	Economics	Any two of the D/ E/ H

09:00			09:30			10:00			10:30		
Teacher	Student	Subject	Teacher	Student	Subject	Teacher	Student	Subject	Teacher	Student	Subject
T		Economics	T		Economics	R	A	Economics	R		Economics
		Sociology		B	Sociology					F	Anthropology
				G	Sociology						

Now D is scheduled in the slot immediately before Q. In that case Q will be in the 9:30 slot and D will be in the 9:00 am slot. Hence D will be mentored by T and one of E/H will be mentored by R and the other by T. Obviously E is guided by R is not necessarily true as he can be mentored by T also.



47. D

following is the order of arrival and departure of cars

	1 (SUV)		2	3	4 (SUV)	
Car 1 leaves	V	V	2	3	4 (SUV)	
Car 5 Arrives	5	V	2	3	4 (SUV)	
Car 6 (SUV) Arrives	5	V	2	3	4 (SUV)	6 (SUV)
Car 4 leaves	5	V	2	3	V V	6 (SUV)
Car 7 (SUV) Arrives	5	V	2	3	7 (SUV)	6 (SUV)
Car 8 Arrives	5	8	2	3	7 (SUV)	6 (SUV)

As we can see that car 2 and car 7 are parked next to car 3

48. D

Let's look at option 4.

Order of cars is 8,2,3,v,5,6,7. This sequence is easily possible.

Let's say cars 1,2,3,4,5,6,7 arrive one after the other.

Now Car 1 leaves and Car 8 takes that place.

Finally Car 4 leaves. Hence we can see that this combination of cars is possible

49. C

The original sequence as given in the question is 4,5,6,V3

This is possible when cars 1,2,3 arrived and then cars 1 and 2 leave. After that cars 4,5 and 6 arrive.

Now there are 4 slots to the left of car 3. This is only possible when cars 1 and 2 were SUVs. Now out of these 4 slots.

3 slots are occupied by cars 4,5 and 6. As a result these are compact cars. Car 3 can be a SUV or a Compact car and it won't impact the final solution.

50. D

Here we can see that cars 3 and 5 are still in their position. Thus car 4 was not the first

car to leave, either 1 or 2 left before 4. Let's say only car 2 left before car 4. Now supposedly if car 2 is an SUV, car 6 was parked in that lot. Thus car 2 and car 7 are compact cars. Option 4 is correct.

Quant

51. A

Let the distance from A to B be "x" then the distance from B to C will be 3x. Now the speed of Train 2 is double of Train 1. Let the speed of Train 1 be "v", then the speed of Train 2 will be "2v" while travelling from A to B.

Time taken by Train 1 = (x/v)

Time taken by Train 2 = $(x/2v)$

Now from B to C distance is "3x" and the speed of Train 2 is (v) and the speed of Train 1 is (2v).

Time taken by Train 1 = $3x/2v$

Time taken by Train 2 = $3x/v$

Total time taken by Train 1 = $x/v(1+(3/2)) = (5/2)(x/v)$

Total time taken by Train 2 = $x/v(3+(1/2)) = (7/2)(x/v)$

$$\text{Ratio of time taken} = \frac{\frac{5}{2}}{\frac{7}{2}} = \frac{5}{7}$$

52. 4

Let Jack take "t" days to complete the work, then John will take "2t" days to complete the work. So work done by Jack in one day is $(1/t)$ and John is $(1/2t)$.

Now let Jim take "m" days to complete the work. According to question, $\frac{1}{t} + \frac{1}{m} = \frac{3}{2t}$ or $\frac{1}{m} = \frac{1}{2t}$ or $m = 2t$
 Hence Jim takes "2t" time to complete the work.

Now let the three of them complete the work in "p" days. Hence John takes "p+3" days to complete the work.

$$\frac{1}{2t}(m+3) = \left(\frac{4}{2t}\right)m$$

$$\frac{1}{2t}(m+3) = \left(\frac{4}{2t}\right)m$$

or $m=1$. Hence Jim will take $(1+3)=4$ days to complete the work. Similarly John will also take 4 days to complete the work



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53. B

$$f(x) = x^2 + ax + b$$

$$f(x+1) = x^2 + 2x + 1 + ax + a + b$$

$$f(x-1) = x^2 - 2x + 1 + ax - a + b$$

$$g(x) = f(x+1) - f(x-1) = 4x + 2a$$

$$\text{Now } g(20) = 72, \text{ from this we get } a = -4; f(x) = x^2 - 4x + b$$

For this expression to be greater than zero it has to be a perfect square which is possible for $b \geq 4$.

Hence the smallest value of 'b' is 4.

54. 90000

For two years the compound interest is $\frac{PR(1)}{100} + \frac{PR(1)}{100} \left(1 + \frac{PR(1)}{100}\right)$

For three years the simple interest is $\frac{9PR}{100}$

Now $R(1) = 5\%$ and $R = 3\%$

Hence $\frac{5P}{100} + \frac{5P}{100} (1.05) - \frac{9P}{100} = 1125$

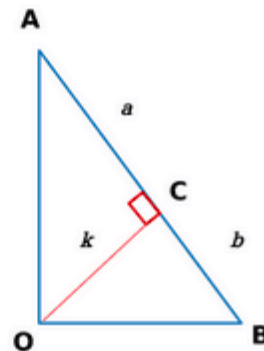
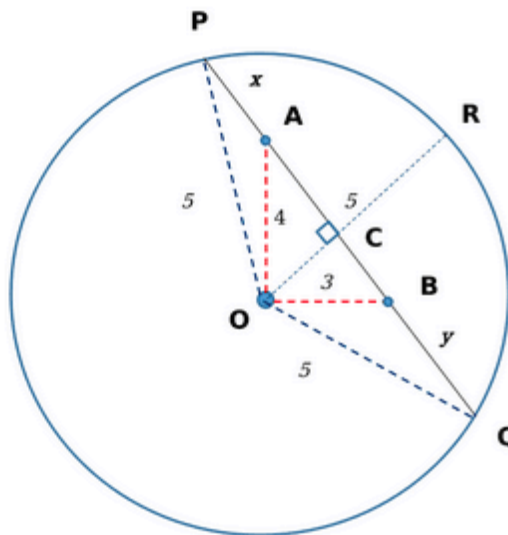
$\frac{-4P}{100} + \frac{5.25P}{100} = 1125$

$\frac{1.25P}{100} = 1125$

Solving we get $P = 90000$

55. A

We can form the following figure based on the given information:



Since $OA = 4$ m and $OB = 3$ m; $AB = 5$ m. OR bisects the chord into PC and QC .

Since $AB = 5$ m, we have $a + b = 5$...(i) Also, $4^2 - k^2 = a^2$...(ii) and $3^2 - k^2 = b^2$...(iii)

Subtracting (iii) from (ii), we get: $a^2 - b^2 = 7 \dots(iv)$

Substituting (i) in (iv), we get $a - b = 1.4 \dots(v)$; $[(a + b)(a - b) = 7; \therefore (a - b) = 7/5]$

Solving (i) and (v), we obtain the value of $a = 3.2$ and $b = 1.8$

Hence, $k^2 = 5.76$

Moving on to the larger triangle $\triangle POC$, we have $5^2 - k^2 = (x + a)^2$.

Substituting the previous values, we get: $(25 - 5.76) = (x + 3.2)^2$

$\sqrt{19.24} = (x + 3.2)$ or $x = 1.19m$

Similarly, solving for y using $\triangle QOC$, we get $y = 2.59m$

Therefore, $PQ = 5 + 2.59 + 1.19 = 8.78 \approx 8.8m$

Hence, Option A is the correct answer.

56. B

Now car A beats car B by 45km. Let the speed of car A be $v(a)$ and speed of car B be $v(b)$.

$\frac{v(a)}{v(b)} = \frac{m}{m-45} \dots(1)$ where "m" is the entire distance of the race track.

Moreover $\frac{v(b)}{v(c)} = \frac{m}{m-50} \dots(2)$

and finally $\frac{v(a)}{v(c)} = \frac{m}{m-90} \dots(3)$

Multiplying (1) and (2) we get (3). $\frac{m}{m-90} = \frac{m}{m-45} \left(\frac{m}{m-50} \right)$

Solving we get $m=450$ which is the length of the entire race track



57. 315

Here there are two cases possible.

Case 1: When 7 is at the left extreme

In that case 3 can occupy any of the three remaining places and the remaining two places can be taken by (0,1,2,4,5,6,8,9)

So total ways $3(8)(7) = 168$

Case 2: When 7 is not at the extremes

Here there are 3 cases possible. And the remaining two places can be filled in $7(7)$ ways. (Remember 0 can't come on the extreme left)

Hence in total $3(7)(7) = 147$ ways

Total ways $168+147 = 315$ ways

58. A

Let the sides of the rectangle be "a" and "3a" m. Hence the perimeter of the rectangle is 8a.

Let the side of the equilateral triangle be "m" cm. Hence the perimeter of the equilateral triangle is "3m" cm. Now we know that $8a+3m=90$(1)

Moreover area of the equilateral triangle is $\frac{\sqrt{3}}{4}m^2$ and area of the rectangle is $3a^2$

According to the relation given $\left(\frac{\sqrt{3}}{4}m^2\right)^2 = 3a^2$

$$\frac{3}{16}m^4 = 3a^2 \text{ or } a^2 = \frac{m^4}{16}$$

$$a = \frac{m^2}{4}$$

Substituting this in (1) we get $2m^2 + 3m - 90 = 0$ solving this we get $m=6$ (ignoring the negative value since side can't be negative)

Hence $a=9$ and the longer side of the rectangle will be $3a=27$ cm

59. 800

Let the amount of money with Amal and Sunil be $6x$ and $4x$. Now the amount of money with Mita be $5x$. Difference between the largest and smallest amount is ₹400 i.e. $6x-4x=400$ or $2x=400$ or $x=200$. Amount of money with Sunil is $200(4)=₹800$

60. C

On expanding the expression we get $1 - \log_a b + 1 - \log_b a$

$$\text{or } 2 - \left(\log_a b + \frac{1}{\log_b a}\right)$$

Now applying the property of $AM \geq GM$, we get that $\frac{\left(\log_a b + \frac{1}{\log_b a}\right)}{2} \geq 1$ or $\left(\log_a b + \frac{1}{\log_b a}\right) \geq 2$ Hence from here we can conclude that the expression will always be equal to 0 or less than 0. Hence any positive value is not possible. So 1 is not possible.

61. C

Now 23 students choose maths as one of their subject.

This means $(MPC) + (MC) + (PC) = 23$ where MPC denotes students who choose all the three subjects maths, physics and chemistry and so on.

So $MC + PM = 5$ Similarly we have $PC + MP = 7$

We have to find the smallest number of students choosing chemistry.

For that in the first equation let PM=5 and MC=0. In the second equation this PC=2.

Hence minimum number of students choosing chemistry will be $(18+2)=20$ Since 18 students chose all the three subjects.

62. B

Let $x(1)$ be the least number and $x(10)$ be the largest number. Now from the condition given in the question, we can say that

$$x(2)+x(3)+x(4)+\dots+x(10) = 47 \times 9 = 423 \dots\dots\dots(1)$$

$$\text{Similarly } x(1)+x(2)+x(3)+x(4)+\dots+x(9) = 42 \times 9 = 378 \dots\dots\dots(2)$$

Subtracting both the equations we get $x(10)-x(1)=45$

Now, the sum of the 10 observations from equation (1) is $423+x(1)$

Now the minimum value of $x(10)$ will be 47 and the minimum value of $x(1)$ will be 2.
Hence minimum average $425/10=42.5$

Maximum value of $x(1)$ is 42. Hence maximum average will be $465/10=46.5$

Hence difference in average will be $46.5-42.5=4$ which is the correct answer

63. C

Let the speed of Ram be $v(r)$ and the speed of Rahim be $v(h)$ respectively. Let them meet after time "t" from the beginning.

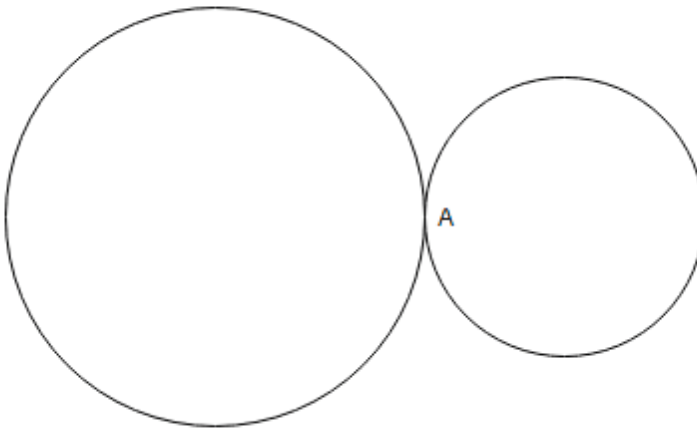
Hence Ram will cover $v(r)t$ during that time and Rahim will cover $v(h)t$ respectively.

Now after meeting Ram reaches his destination in 1 min i.e. Ram covered $v(h)t$ in 1 minute or $v(r)(1)=v(h)(t)$

Similarly Rahim reaches his destination in 4 min i.e. Rahim covered $v(r)t$ in 4 minutes or $v(h)(4)=v(r)(t)$

Dividing both the equations we get $\frac{v(r)}{4v(h)} = \frac{v(h)}{v(r)}$ or $\frac{v(r)}{v(h)} = 2$ Hence the ratio is 2.

64. B



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To complete one round Ram takes 100m/15kmph and Rahim takes 20m/5kmph

They meet for the first time after L.C.M of $(100\text{m}/15\text{kmph}, 20\text{m}/5\text{kmph}) = 100\text{m}/5\text{kmph} = 20\text{m}/\text{kmph}$.

Distance traveled by Ram = $20\text{m}/\text{kmph} * 15\text{kmph} = 300\text{m}$.

So, he must have ran $300/100 = 3$ rounds.

Note:

CAT gave both 2 and 3 as correct answers because of the word 'before'.

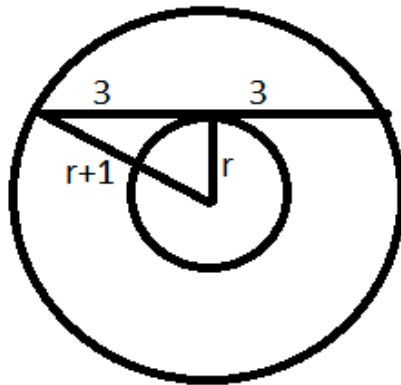
65. 10

Now we know that the perpendicular from the centre to a chord bisects the chord.

Hence at the point of intersection of tangent, the chord will be divided into two parts of 3 cm each. As you can clearly see in the diagram, a right angled triangle is formed there.

$$\text{Hence } (r + 1)^2 = r^2 + 9 \text{ or } r^2 + 1 + 2r = r^2 + 9 \text{ or } 2r = 8 \text{ or } r = 4\text{cm}$$

Hence the radius of the larger circle is 5cm and diameter is 10cm.



66. A

Let the CP of the each toy be "x". CP of 12 toys will be "12x". Now the shopkeeper made a 10% profit on CP. This means that

$$12x(1.1) = 2112 \text{ or } x=160. \text{ Hence the CP of each toy is ₹160.}$$

Now let the SP of each toy be "m". Now he sold 8 toys at 20% discount. This means that $8m(0.8)$ or $6.4m$

He sold 4 toys at an additional 25% discount. $4m(0.8)(0.75)=2.4m$. Now $6.4m+2.4m=8.8m=2112$ or $m=240$

Hence CP=160 and SP=240. Hence profit percentage is 50%.

67. A

$$(x^2 - 5x + 7)^{x+1} = 1$$

There can be a solution when $(x^2 - 5x + 7) = 1$ or $x^2 - 5x + 6 = 0$

or $x=3$ and $x=2$

There can also be a solution when $x+1 = 0$ or $x=-1$

Hence three possible solutions exist.



68. 17

We have $2x + 5y = 99$ or $x = \frac{(99-5y)}{2}$

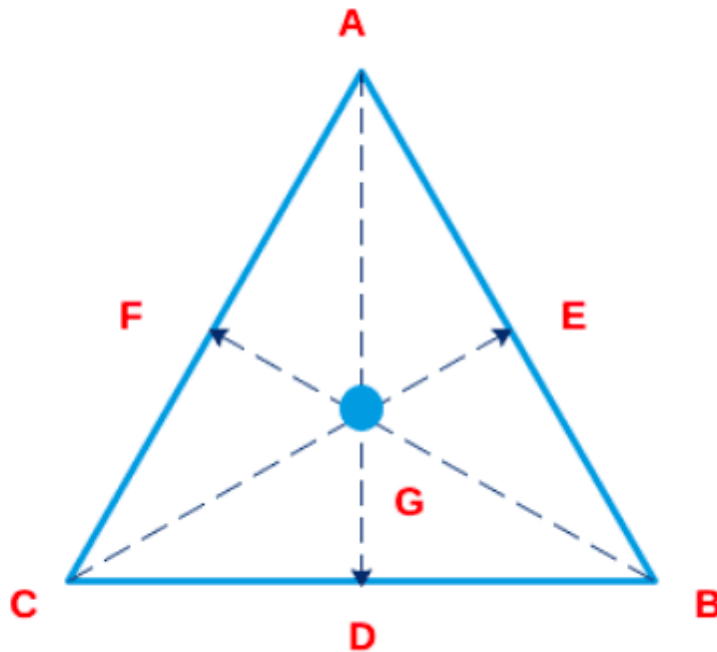
Now $x \geq y \geq -20$; So $\frac{(99-5y)}{2} \geq y$; $99 \geq 7y$ or $y \leq \approx 14$

So $-20 \leq y \leq 14$. Now for this range of "y", we have to find all the integral values of "x". As the coefficient of "x" is 2,

then $(99 - 5y)$ must be even, which will happen when "y" is odd. However, there are only 17 odd values of "y" between -20 and 14.

Hence the number of possible values is 17.

69. D



Based on the question: AD, CE and BF are the three altitudes of the triangle. It has been stated that $\{GD+GE+GF = s\}$

Now since the triangle is equilateral, let the length of each side be "a". So area of triangle will be

$$\frac{1}{2} \times GD \times a + \frac{1}{2} \times GE \times a + \frac{1}{2} \times GF \times a = \frac{\sqrt{3}}{4} a^2$$

$$\text{Now } GD + GE + GF = \frac{\sqrt{3}a}{2} \text{ or } s = \frac{\sqrt{3}a}{2} \text{ or } a = \frac{2s}{\sqrt{3}}$$

Given the area of the equilateral triangle = $\frac{\sqrt{3}}{4} a^2$; substituting the value of 'a' from above, we get the area (in terms 's') = $\frac{s^2}{\sqrt{3}}$

70. D

Let the first term of the GP be "a". Now from the question we can show that

$$ar^{m-1} = \frac{3}{4} \quad ar^{n-1} = 12$$

Dividing both the equations we get $r^{m-1-n+1} = \frac{1}{16}$ or $r^{m-n} = 16^{-1}$ or $r^{n-m} = 16$

So for the minimum possible value we take Now give minimum possible value to "r" i.e -4 and n-m=2

Hence minimum possible value of r+n-m=-4+2=-2

71. A

Let John buy "m" kg of rice and "p" kg of wheat.

Now let the price of rice be "r" in April. Price in May will be "1.2(r)"

Now let the price of wheat be "w" in April. Price in April will be "1.12(w)".

Now he spent ₹150 more in May, so $0.2(rm) + 0.12(wp) = 150$

Its also given that he had spent ₹450 on rice in April. So $(rm) = 450$

So $0.2(rm) = (0.2)(450) = 90$. Substituting we get $(wp) = 60/0.12$ or $(wp) = 500$

Amount spent on wheat in May will be $1.12(500) = ₹560$

72. 23

We can write $x = z - 9$ and $y = z - 1$. Now we have $x + y < z + 5$

Substituting we get $z - 9 + z - 1 < z + 5$ or $z < 15$

Hence the maximum possible value of z is 14

Maximum value of "x" is 5 and maximum value of "y" is 13

Now $2x + y = 10 + 13 = 23$

73. A

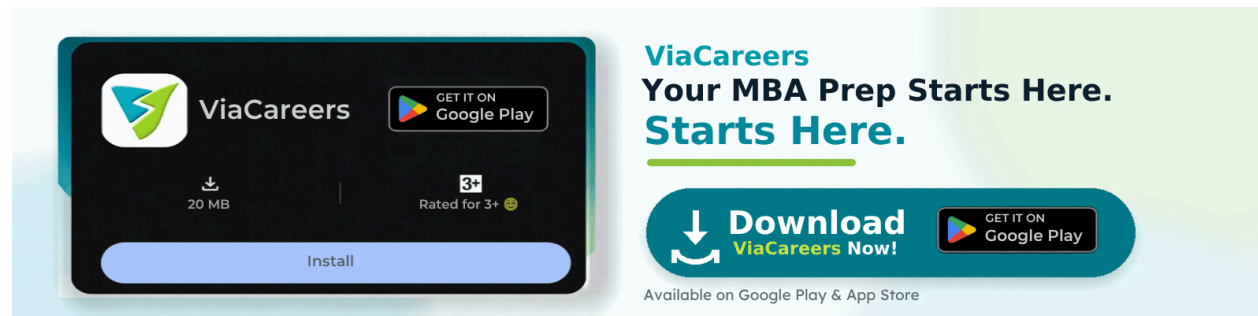
Let the number of pencils bought by Aron be "p" and the cost of each pencil be "a".

Let the number of sharpeners bought Aron be "s" and the cost of each sharpener be "b".

Now amount spent by Aron will be (pa)+(sb)

Aditya bought (2p) pencils and (s-10) sharpeners. Amount spent will be (2pa)+(s-10)b

Amount spent in both the cases is same



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$$pa + sb = 2pa + (s-10)b \text{ or } pa=10b$$

Now its given in the question that cost of sharpener is 2 more than pencil i.e. $b=a+2$

$$pa = 10a+20 \text{ or } a=20/(p-10)$$

Now the number of pencils has to be minimum, for that we have to find smallest "p" such that both "p" and "a" are integers. The smallest such value is $p=11$. Total number of pencils bought will be $p+2p=11+22=33$

74. D

$$\text{Now } \frac{x}{\sqrt{1+x^4}} = \frac{1}{\sqrt{\frac{1+x^4}{x^2}}} = \frac{1}{\sqrt{\frac{1}{x^2}+x^2}}$$

Applying A.M $\geq$ G.M.

$$\frac{\left(\frac{1}{x^2}+x^2\right)}{2} \geq 1 \text{ or } \frac{1}{x^2} + x^2 \geq 2 \text{ Substituting we get the maximum possible value of the equation as } \frac{1}{\sqrt{2}}$$

75. D

$$x^2 - 2|x| + |a - 2| = 0$$

where $x \geq 0$ and $x \geq 2$

$x^2 - 2x + a - 2 = 0$ Using quadratic equation we have $x = 1 + \sqrt{3 - a}$ and $x = 1 - \sqrt{3 - a}$ Only two integer values are possible

$a=2$ and $a=3$. So corresponding "x" values are $x=1$ and $a=3$, $x=2$ and $a=2$, $x=0$ and $a=2$

where $x \geq 0$ and $x < 2$

Applying the above process we get $x=1$ and $a=1$

where $x < 0$ and $x \geq 2$ we get $a=3$ and $x=-1$, $a=2$ and $x=-2$

where $x < 0$ and $x < 2$ we get $a=1$ and $x=-1$

Hence there are total 7 values possible

76. 2704

$$\text{Now we have } 2601 \left(1 + \frac{1}{x}\right) \left(1 + \frac{1}{y}\right) = 2601 \left(\frac{xy+y+x+1}{xy}\right)$$

Now we know that $x+y=102$. Substituting it in the above equation

$$2601 \left(\frac{xy+y+x+1}{xy}\right) = 2601 \left(\frac{103}{xy} + 1\right)$$

Maximum value of xy can be found out by $AM \geq GM$ relationship

$$\frac{x+y}{2} \geq \sqrt{xy} \text{ or } \sqrt{xy} \leq 51 \text{ or } xy \leq 2601$$

Hence the maximum value of "xy" is 2601. Substituting in the above equation we get

$$2601 \left(\frac{103+2601}{2601}\right) = 2704$$