

DATA INTERPRETATION AND REASONING CAT 2006 Solution

1. Solution: (Option C)

Dipan's total score = $(98+98+98)+(95)+(96+95)+(96+94)+(96+?)$
 Or, $98+95+95.5+95+(96+?) = 96 \times 5 = 480$ (average multiplied by number of sections)
 Or, $96+? = (480-383.5) \times 2 = 96.5 \times 2 = 193$ (Ave multiplied by no. of papers)
 $? = 193-96 = 97$

2. Solution: Shreya's Ave score in PCB will always be less than 95 so option 1 is ruled out.

Ram's score in vernacular is less than 95 so option 2 is ruled out.

Ayesha's score in Social Science is less than 95.
 Dipan gets the prize. Option (D)

3. Solution:

Dipan was the only boy to score at least 95 in at least one paper from each of the groups.

Hence, option A.

4. Solution:

A quick look at the score reveals that Dipan's score is having more consistency than others. Hence he will be the topper.

5. Solution: Joseph gets a hike of $100-95.5 = 4.5$ in social science

So gets a hike of $4.5/5 = 0.9$ in total average

Joseph's new average = $95+ 0.9 = 95.9$

Agni gets a hike of $100-95.5 = 4.5$

Agni's new average = $94.3+0.9 = 95.2$

Pritam gets a hike of $100-89 = 11$

Pritam's new average = $94.3+2.2=96.5$

Tirna gets a hike of $100-89.5 = 10.5$

Tirna's new average = $93.7+2.1 = 95.8$

Their ranking in chronological order is as follows:

Pritam, Joseph, Tirna, Agni,

Option (A)

6. Solution:

Let F and E have Erdős numbers f and e respectively, at the beginning of the conference.

On the third day, A's and C's Erdős numbers become $(f + 1)$ The sum of Erdős numbers changed to $8 \times 3 = 24$

At the end of the third day, five members had identical Erdős numbers while the other three had distinct ones.

On the fifth day, E's Erdős numbers became $f + 1$ and this reduced the group's average by 0.5. This means that E's Erdős numbers was not $f + 1$ on the third day. Thus we have,

At the end of the third day,

$$5(f + 1) + f + e + y = 24$$

$$\text{Hence } 6f + 5 + e + y = 24$$

$$\text{Hence } 6f + e + y = 19$$

At the end of the fifth day,

$$6(f + 1) + f + y$$

$$= 2.5 \times 8 = 20$$

$$\text{Hence } 7f + y = 14$$

Among the eight mathematicians, F has the smallest Erdős number.

$$\text{Let } f = 2$$

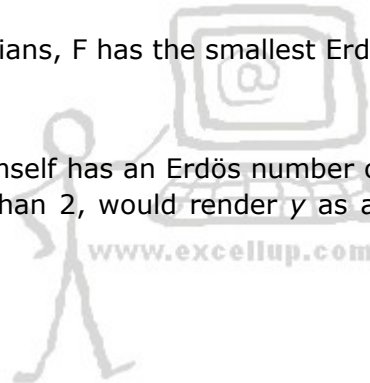
$$y = 0$$

However, only Paul Erdős himself has an Erdős number of 0. So f cannot be equal to 2. Any other value greater than 2, would render y as a negative number, which is also not possible.

$$\text{So, } f = 1$$

$$y = 7$$

$$e = 6$$



Now, all questions can be solved.

From the above explanation, the largest Erdős number at the end of the conference would be 7.

Hence, option B.

7. Solution:

Erdős numbers of B, D, G, H and F did not change during the conference.

Hence, option D.

8. Solution:

As follows from the explanation given in the first question, C's Erdős number was $f + 1 = 2$ on the third day and thereafter.

Hence, option B.

9. Solution:

E's Erdős number was 6.
Hence, option C.

10. Solution:

Since 5 participants had identical Erdős numbers at the end of day three and two of these were A and C whose Erdős numbers had changed on the same day, three had the same Erdős numbers at the beginning of the conference.
Hence, option B.

11. Solution:

Let the price of the share rise on x days and fall on y days. As the price increases by Rs. 10 in the five days, we have:

$$x + y = 5 \text{ and } 10x - 10y = 10$$

Solving the above two equations simultaneously, we have
 $x = 3$ and $y = 2$

The price of the share goes up on 3 days and falls on 2 days.

The three days on which the price rises can be selected in ${}^5C_3 = 10$ ways The following are the 10 cases:

		Day 1	Day 2	Day 3	Day 4	Day 5	Chetan		Michael	
							Cash	Shares	Cash	Shares
Case 1	Opening	100	110	120	130	120	1300	-10	3700	-30
	Closing	110	120	130	120	110				
Case 2	Opening	100	90	80	90	100	1300	-10	-800	10
	Closing	90	80	90	100	110				
Case 3	Opening	100	90	100	110	120	1300	-10	1200	-10
	Closing	90	100	110	120	110				
Case 4	Opening	100	110	100	110	100	1300	-10	0	0
	Closing	110	100	110	100	110				
Case 5	Opening	100	110	120	110	120	1300	-10	2400	-20
	Closing	110	120	110	120	110				
Case 6	Opening	100	110	120	110	100	1300	-10	1200	-10
	Closing	110	120	110	100	110				
Case 7	Opening	100	90	100	110	100	1300	-10	0	0
	Closing	90	100	110	100	110				
Case 8	Opening	100	110	100	110	120	1300	-10	1200	-10
	Closing	110	100	110	120	110				
Case 9	Opening	100	90	100	90	100	1300	-10	0	0
	Closing	90	100	90	100	110				
Case 10	Opening	100	90	100	90	100	1300	-10	0	0
	Closing	110	100	90	100	110				

Consider Case 5

Chetan sells on Days 1, 2 and 4 and buys on days 3 and 5. Change in the number of shares he has = -30

$$+ 20 = -10$$

$$\text{Change in his cash} = 10 \times (110 + 120 + 120) - 10 \times (110 + 110) = \text{Rs. } 1300$$

Michael sells on days 2 and 4, but never buys as the share price does not go below Rs. 90.

$$\text{Change in the number of shares he has} = -20$$

$$\text{Change in his cash} = 10 \times (120 + 120)$$

$$= \text{Rs. } 2400$$

Chetan sold on three consecutive days Cases

1, 2 and 3

Michael sold only once Case 3

The price of the share at the end of day 3 = Rs. 110

Hence, option C.

12. Solution:

Michael ends up with Rs. 100 less cash than Chetan in cases 3, 6 and 8. In each of these cases, both of them hold the same number of shares at the end of day 5.

Hence, option E.

13. Solution:

This information corresponds to cases 4, 7, 9 and 10 from the solution table. The price at the end of day 4 in each of these cases is Rs. 100.

Hence, option B.

14. Solution:

The maximum increase in combined cash balance of Chetan and Michael = 1300 + 3700 = Rs. 5000 (case 1 from the table)

Hence, option D.

15. Solution:

This information corresponds to case 2 from the table. The price at the end of day 3 was Rs. 90.

Hence, option A.

16. Solution:

$$\text{Cost for SAT route} = 9+5 = 14$$

Let us assume this to be the cost involved while following any route.

Then, cost for SBAT (Minus toll) = 2+2+5 = 9, so a toll of 5 can be charged at B.

Cost for SDT (Minus toll) = 7+6 = 13, so a toll of 1 can be charged at D

Cost for SDCT (Minus toll) 7+1+2 = 10, so a toll of 4 can be charged on this route.

Since toll of 1 is being charged at D, so additional toll of 3 can be charged at C.

Option (B)

17. Solution: Since the cost of travel including toll on routes S-A-T, S-B-C-T, S-B-A-T and S-D-C-T is the same.

$$14+A = 7+B+C = 9+A+B = 10 +C+D$$

Checking these conditions for toll rates in options we get

Option A,

$$14+1 = 7+5+3 = 9+1+5 \neq 10+3+3$$

Option B,

$$14+1 = 7+4+4 \neq 9+1+4 \neq 10+4+3$$

Option C,

$$14+1 \neq 7+5+4$$

Option D,

$$14+0 = 7+5+2 = 9+0+5 \neq 10+2+3$$

Option E,

$$14+0 = 7+5+2 = 9+0+5 = 10+2+2$$

18. Solution:

Since the cost of travel including toll on routes S-A-T, S-B-C-T, S-B-A-T and S-D-C-T is the same.

$$14+A = 7+B+C = 9+A+B = 10 +C+D$$

Route	A	B	C	D	E
SAT	14	14	15	15	15
SBCT	14	16	15	15	16
SBAT	14	14	15	15	15
SDCT	14	15	16	15	16

It is clear from above table that option D is the correct option

19. Solution:

As toll at C is highest in option (A)

so this is the correct answer.

20. Solution:

If toll charges at all junctions are made 0, 100% traffic will pass through S-B-C-T. This is not possible.

If toll charges at A and B are made 0, then 100% traffic will pass through S-B-A-T. This is also not possible.

If toll charges at C and D are made 0, that at B are made Rs.3, then the traffic will get equally divided between S-D-C-T and S-B-C-T.

Thus, the cost incurred will be Rs.10.

Hence, option C.

21. Solution:

Conditions as per question:

P/R/S

M/Q

K+L

S+U+W

L x N

L x U

If K is in the team then L will also be there.

U, N, S, & W cannot be in the team.

Additionally, one from P/R/S and another from M/Q must be in the team.

So, team strength will be 4.

Option E.

22. Solution:

P/R/S

M/Q

K+L

S+U+W

L x N

L x U



If N is in the team then L cannot be in the team.

This makes the possibility of S+U+W to be in the team.

Either of M or Q can be in the team.

One from P/R/S will be in the team.

Possible teams:

NMP

NMR

NQP

NQR

NMSUW

NQSUW

23. Solution: For largest possible team SUW need to be in the team.

Possible teams can be

SUWMN

SUWQN

Option (D)

24. Solution: If K or L are included then SUW will be excluded so the largest possible team cannot be made. Referring to previous questions solution it is clear that out of given options M will be the part of the team., **Option (C)**

25. Solution:

A team sized 3 has to have M or Q and P or R. The only other member that can be selected all alone is N.

L cannot be selected as K has to be selected with him. Hence, option A.



ENGLISH CAT 2006 Solution

1. Solution:

None of the statements can be verified, and there is no conclusion based on a known fact. All are opinions, with which some people may agree or may not agree.

Hence, option D.

2. Solution:

The comment on quality is a judgement in statement 1 and likelihood of people switching to private initiative is also a judgement. Statement 2 is a fact which can be cross checked. Statement 3 is an inference.

Hence, option A.

3. Solution:

Statement 1 is an inference based on 'all statistical indication.....'. Statement 2 is an inference as it talks about intangible things. Statement 3 is a fact which can be cross checked. The term pre-requisite gives the clue that statement 4 is a judgement. Option C.

4. Solution: Statement 2 is a fact, so option C is eliminated. Statement 4 is not a fact so it leaves options B and E to be looked into. The first part of statement 4 is a fact and the latter part of this statement is an inference based on that fact. Option (E)

5. Solution:

Last sentence is a fact, this eliminates option A. Statement 1 is an opinion which can vary from individual to individual so it is a judgement. This eliminates options C and E. As both options B and E have I for statement 2 so no need to waste your precious time on this statement. Once again statement 3 can be true or false and the outcome depends on so many factors. So this is a judgement.

Option B.

6. Solution:

Options D and E can be easily eliminated as this is not a discussion about consumer behaviour. The narrator clearly says in the beginning that he hates rules. This makes option C as the best choice as it completes the paragraph with more clarity.

7. Solution:

There is no talk of innovations so option D is eliminated. The initial part talks about smoothening of production so inefficiency of supply chain does not come into picture eliminating option B. There is no negative talk about the 'deal making' or a ensuing fight among various stakeholders so options A and C get eliminated. This leaves option E.

8. Solution: There is no historic perspective mentioned here so options C and D can be eliminated as using this will require more clarifications from history. Whether US is having penchant or intention to use force is open to scrutiny so options A and E are eliminated. This leaves option B.

9. Solution: The paragraph starts with the likelihood of a person exploiting entrepreneurial opportunity. Option D gives the perfect end to the paragraph.

10. Solution:

There is discussion of how useful a good theory can be. Options B, D and E limit the scope of this paragraph. The start of the paragraph indicates towards a larger scope. Option C is talking about one of the aspects. Option A is talking about the benefits of certain features of a good theory. So option A is the best choice.

11. Solution: Options A and B are not criticizing communism. There is no mention of economic failure in the paragraph so option E is eliminated. There is no discussion on views of communist regime so option D is eliminated. Large scale violence and oppression by communist regime has been mentioned in the paragraph indicating towards option C.

12. Solution: As except in few nations communism is virtually a thing of the past, so options D and E can be easily eliminated. European imperialists were part of capitalistic society as has been mentioned in the 3rd paragraph, so option C is eliminated. A is totally unrelated leaving option B as the correct answer.

13. Solution: Initially the author starts by criticizing Mr. Lindblad's attempts and arguments. So his aim would be to neutralize Mr. Lindblad's arguments. As the author discusses about communism's atrocities as well so option D can be eliminated. So, option E is the correct answer.

14. Solution: The third paragraph mentions racial despotism and tries to establish a similarity between colonialism and Nazism on this ground, so option A is the correct answer.

15. Solution: The last sentence of the fifth paragraph indicates towards option D as this is what the author presumes as the compelling reason.

16. Solution:

Option 1 is eliminated because 'a just society' is not a Utopia.

Between options 3 and 4, the idea of fairness, which is casually mentioned in option 4, is fully explained in option 3 and is essential to answer the question, because the word 'fair' has a special and specific definition in the passage.

Hence, option 3.

17. Solution:

The passage starts with the conception of an idea which may or may not become a

reality. Options C, D and E indicate towards absolute possibility of such a situation, so they can be eliminated. Option B is eliminated as the passage doesn't discuss equality in society. Option A is the correct answer.

18. Solution: The passage talks about rational men formulating the principles of justice. This eliminates option B as school kids cannot be rational. The passage talks about ignorance of social position a prerequisite so options A and C can be eliminated as businessmen will be aware of their position in society. Option D is the best option as the rule makers sure of not getting anything out of those rules in their current lives thus removing scope of bias from their minds.

19. Solution: Option A and C are eliminated as they don't mention the initial agreement. Evolution of the system is not discussed in the passage so option D is eliminated. Out of options B and E, the most complete statement is B hence is the correct answer.

20. Solution: Option A is eliminated as it indicates towards a person's ability to make his position in society. Option B can be eliminated as this will also require prior knowledge of kinds of work available. Similarly options C and E can be eliminated, leaving option D as the correct answer.

21. Solution: The author discusses about a scientific theory being given as a challenge for coming generations so that it can be criticized and modified. Option B is similar as a chisel takes its own time to modify a sculpture and artist is never hundred percent sure of the final outcome.

22. Solution: The author harps on the positive effect of a dogmatic attitude which leads humans to progress. This eliminates options C, D and E. Dogmatic attitude alone cannot help develop science, rather a critical approach is more important so option A is the best answer.

23. Solution: Option D is easily the best option as the author discusses in the last sentence of the second paragraph where he correlates it with lack of maturity and development of maturity.

24. Solution: Options B and C can be easily eliminated. A critical attitude is about questioning as discussed while discussing Hume's theory indicate towards rest of the options. The last paragraph mentions the tentativeness of scientific theories so option E is the best option.

25. Solution: In the paragraph discussing Hume's theory the author discusses how dogmatism tries to verify observations so as to implement them while science always questions an existing dogma point to option C.

Mathematics

CAT 2006 Solution

1. Solution:

$$0.5 = \frac{1}{2}$$

$$\text{Option C will be } \frac{1}{x} = \frac{1}{-0.5} = -2$$

All other options will become positive because of power 2, so C is the correct answer.

2. Solution:

Let us convert all the powers so that their denominators are same, i.e. 12

$$\text{So, } 2^{\frac{1}{2}} = 2^{\frac{6}{12}} = 64^{\frac{1}{12}}$$

$$3^{\frac{1}{3}} = 3^{\frac{4}{12}} = 81^{\frac{1}{12}}$$

$$4^{\frac{1}{4}} = 4^{\frac{3}{12}} = 64^{\frac{1}{12}}$$

$$6^{\frac{1}{6}} = 6^{\frac{2}{12}} = 36^{\frac{1}{12}}$$

Option B is having the largest base and power of all options is same, so option B is the correct answer.

3. Solution:

$$\frac{abc}{def} = \frac{a}{d} \times \frac{b}{e} \times \frac{c}{f}$$

$$\frac{a}{b} \times \frac{b}{c} \times \frac{c}{d} = \frac{a}{d} = \frac{1}{3} \times 2 \times \frac{1}{2} = \frac{1}{3}$$

$$\frac{b}{c} \times \frac{c}{d} \times \frac{d}{e} = \frac{b}{e} = 2 \times \frac{1}{2} \times 3 = 3$$

$$\frac{c}{d} \times \frac{d}{e} \times \frac{e}{f} = \frac{c}{f} = \frac{1}{2} \times 3 \times \frac{1}{4} = \frac{3}{8}$$

$$\Rightarrow \frac{abc}{def} = \frac{1}{3} \times 3 \times \frac{3}{8} = \frac{3}{8}$$

Option A

4. Solution:

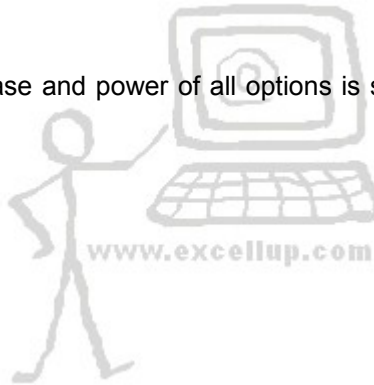
Area of four walls = *Height* × *Perimeter*

$$\text{Area for original dimensions} = 2 \times 1 \times (3 + 2) = 10$$

Now after halving the breadth and the height and doubling the length

$$\text{Area} = 2 \times 0.5(6 + 1) = 7$$

Area decreases by 30 %; Option E.



5. Solution:

$$t_3 = \frac{3}{5}$$

$$t_4 = \frac{4}{6}$$

$$t_5 = \frac{5}{7}$$

$$t_6 = \frac{6}{8}$$

$$t_{50} = \frac{50}{52}$$

$$t_{51} = \frac{51}{53}$$

$$t_{52} = \frac{52}{54}$$

$$t_{53} = \frac{53}{55}$$

$$\frac{3}{5} \times \frac{4}{6} \times \frac{5}{7} \times \frac{6}{8} = 3 \times 4$$

$$\frac{50}{52} \times \frac{51}{53} \times \frac{52}{54} \times \frac{53}{55} = \frac{1}{54 \times 55}$$

So, the required answer will be

$$\frac{3 \times 4}{54 \times 55} = \frac{2}{495} \text{ Option A.}$$


6. Solution:

Sum of n terms is given by

$$\frac{n}{2} \times [2a + d(n - 1)]$$

$$\Rightarrow 630 \times 2 = n[2a + d(n - 1)]$$

Using Option A we get

$$3[2a + 3(3 - 1)] = 1260$$

$$\Rightarrow 6a + 18 = 1260$$

$$\Rightarrow a = 207$$

Using Option B we get
 $4[2a + 3(4 - 1)] = 1260$
 $\Rightarrow 8a + 36 = 1260$
 $\Rightarrow a = 153$

Using Option C we get
 $5[2a + 3(5 - 1)] = 1260$
 $\Rightarrow 10a + 60 = 1260$
 $\Rightarrow a = 120$

Using Option D we get
 $6[2a + 3(6 - 1)] = 1260$
 $\Rightarrow 12a + 90 = 1260$
 $\Rightarrow a = 97.5$

As this value of a is not an integer so this is the correct option

7. Solution:

$$2^{0.7x} \times 3^{-1.25y} = \frac{8\sqrt{6}}{27} \dots\dots\dots (1)$$

$$4^{0.3x} \times 9^{0.2y} = 8 \times 81^{\frac{1}{5}} \dots\dots\dots (2)$$

Let us solve RHS of equation (1)

$$8 \times \sqrt{2} \times \sqrt{3} \div 3^3 = 2^3 \times 2^{\frac{1}{2}} \times 3^{\frac{1}{2}} \div 3^3$$

$$= 2^{3+\frac{1}{2}} \times 3^{\frac{1}{2}-3} = 2^{\frac{7}{2}} \times 3^{-\frac{5}{2}} \dots\dots\dots (3)$$

From equation (3) and equation (1) it is clear

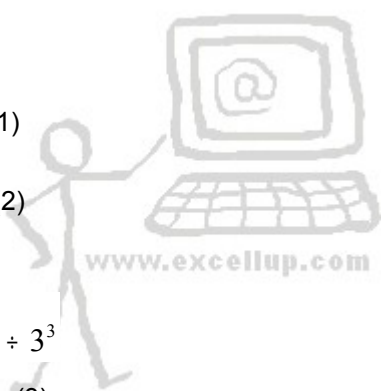
$$0.7x = \frac{7}{2}$$

$$\Rightarrow x = \frac{7}{2} \times \frac{10}{7} = 5$$

$$-1.25y = -\frac{5}{2}$$

$$\Rightarrow y = \frac{5}{2} \times \frac{4}{5} = 2$$

Option E



8. Solution:

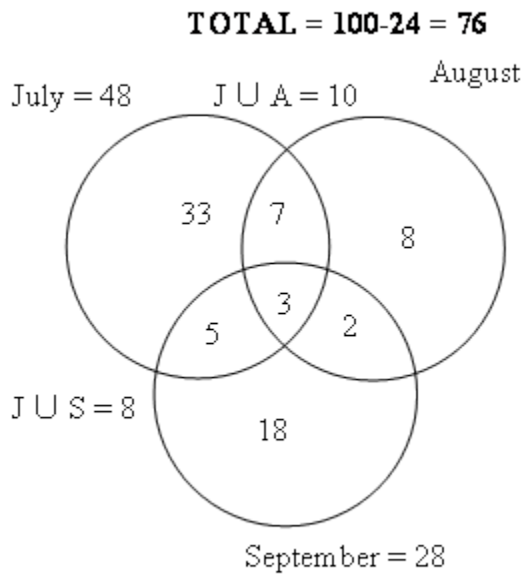
$$2x + y = 40$$

$$\Rightarrow y = 40 - 2x$$

X	1	2	3	4	5	6	7	8	9	10	11	12	13
Y	38	36	34	32	30	28	26	24	22	20	18	16	14

If $x > 13$ then value of y will be negative so there are 13 unique values of x and y which satisfy all conditions. Hence option B is correct answer.

9. Solution:



7 people have read July and August issues and 2 people have read August and September issues. So, option B is the correct answer.

10. Solution:

Unit digits of four consecutive odd numbers will be any of the following four combinations:

- 1, 3, 5, 7
- 3, 5, 7, 9
- 5, 7, 9, 1
- 7, 9, 1, 3

Adding unit digits only fourth combination gives a zero as unit digit so will be divisible by 10.

The numbers can be as follows:

$$10x + 7, 10x + 9, 10x + 11 \text{ and } 10x + 13$$

Their sum will be

$$40x + 40$$

Dividing the sum by 10 we get

$$(40x + 40) \div 10 = 4x + 4$$

As the numbers are 2 digit numbers so value of $x < 10$

And $x+1$ should be a perfect square

4 and 9 are perfect squares and are less than 10

So, x can be either 3 or 8

Option C = 41 is closer so let us check this option

37, 39, **41**, 43

Sum = 160

$160 \div 10 = 16$ is a perfect square

11. Solution:

Hence, option D.

12. Solution:

$$a = 1$$

$$d = ?$$

$$n \geq 3$$

$$1000 = 1 + (n - 1)d$$

$$\Rightarrow 999 = (n - 1)d$$

Factors of 999 are as follows:

1, 3, 9, 27, 37, 111, 333 and 999

$d = 999$ is not possible as it will give a value of $n < 3$

Similarly if $d = 333$

$$\text{Then, } 999 = (n - 1)333$$

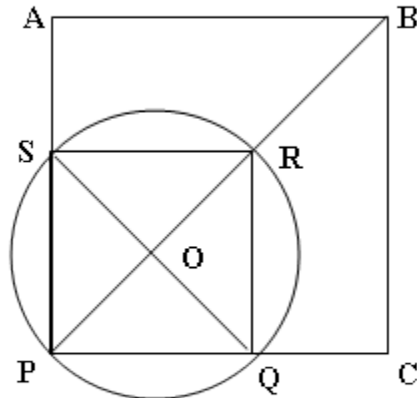
$$\Rightarrow n - 1 = 3$$

$$\Rightarrow n = 4 \geq 3$$

So starting from 1 the value of d can be up to 333

Hence there can be 7 AP, Option D is the correct answer.



13. Solution:


$$PR=2$$

$$AB=2$$

$$\text{Area of circle} = \pi \times 1^2 = \pi$$

$$\text{Area of sectors } POQ + POS$$

$$= \frac{\pi}{2}$$

$$\text{Area of } \triangle POQ + \triangle POS = 2 \left(\frac{1}{2} \times 1 \times 1 \right) = 1$$

So, area of the portion of circle outside the hole

$$= \frac{\pi}{2} - 1 = \frac{\pi - 2}{2}$$

So, area of hole

$$= \pi - \frac{\pi - 2}{2} = \frac{\pi + 2}{2}$$

Area of aluminium sheet = 4

So area of the remaining portion

$$= 4 - \frac{\pi + 2}{2} = \frac{6 - \pi}{2}$$

So proportion of area that remains after punching the hole

$$= \frac{6 - \pi}{8}$$

Option B

14. Solution:

Option D as per previous calculations

15. Solution:

Let us assume $x^{\frac{1}{3}} = y$

Then, $x^{\frac{2}{3}} + x^{\frac{1}{3}} \leq 2$ can be written as follows:

$$y^2 + y \leq 2$$

$$\Rightarrow (y+2)(y-1) \leq 2$$

$$\Rightarrow -2 \leq y \leq 1$$

$$\Rightarrow -2 \leq x^{\frac{1}{3}} \leq 1$$

$$\Rightarrow 8 \leq x \leq 1$$

Option E.

16. Solution:

Option E

17. Solution:

Let us assume free luggage = f

$$\frac{1200}{Raja - f} = \frac{2400}{Pr aja - f} = \frac{5400}{60 - f}$$

$$Raja + Pr aja = 60$$

Using this value in the first two parts of the equation we get

$$\Rightarrow \frac{1}{60 - Pr aja - f} = \frac{2}{Pr aja - f}$$

$$\Rightarrow Pr aja - f = 120 - 2Pr aja - 2f$$

$$\Rightarrow 3Pr aja + f = 120$$

$$\Rightarrow Pr aja = \frac{120 - f}{3}$$

Using this value in the last two parts of equation we get

$$\Rightarrow \frac{7200}{120 - f - 3f} = \frac{5400}{60 - f}$$

$$\Rightarrow \frac{4}{120 - 4f} = \frac{3}{60 - f}$$

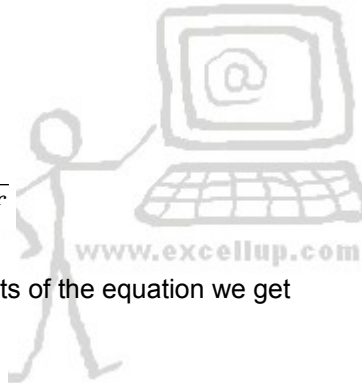
$$\Rightarrow 240 - 4f = 360 - 12f$$

$$\Rightarrow 240 + 8f = 360$$

$$\Rightarrow 8f = 120$$

$$\Rightarrow f = 15$$

So,



$$\text{Rate} = 5400 \div (60 - 15) = 120$$

Raja is paying for 10 kg and he is having $10+15 = 25$ kg luggage
Praja is paying for 20 kg and he is having $20+15 = 35$ kg luggage

Option D

18. Solution:

Option B as per previous calculations

19. Solution:

Arun = 30 km/hr

Barun = 40 km/hr

Kiranmala = 60 km/hr

Barun's relative speed against Arun = $40-30 = 10$ km/hr.

When Barun starts 2 hrs after Arun by that time

Distance traveled by Arun = 60 kms

So Barun takes 6 hrs to catch Arun

Distance travelled by Barun in 6 hrs = 240 kms

Distance covered by Arun in $2+6$ hrs = 240 kms.

Kiranmala will need 4 hours to cover 240 kms

Kiranmala's relative speed against Barun = $60-40 = 20$ km/hr

Kiranmala's relative speed will enable him to close the gap

By $20 \times 4 = 80$ kms in 4 hrs

So, when Kiranmala starts Barun has already covered a distance of 80 kms after travelling for 2 hrs ($40 \times 2 = 80$)

Hence Kiranmala starts 2 hrs after Barun and 4 hrs after Arun.

Option C.

20. Solution:

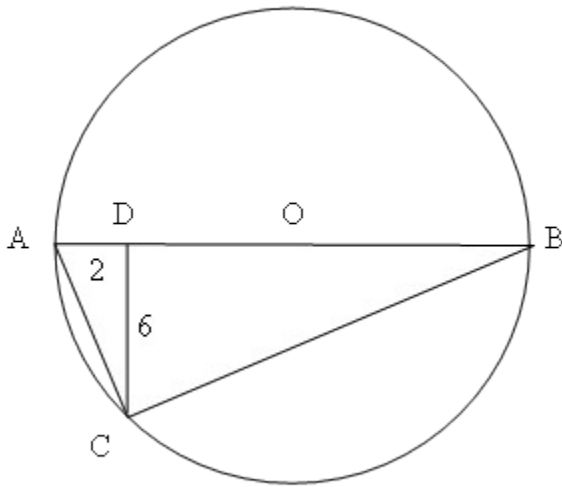
The difference in numbers after reversing the digits of a two digit number depends on the difference between digits and is 9 times the difference.

In the question the difference between digits is 2 hence the number increases by 18 on reversing the digits. Following numbers give same possibility

24, 35, 46, 57, 68, 79

Option B

21. Solution:



$$\triangle ABC \approx \triangle ACD$$

$$\frac{AD}{DC} = \frac{AC}{CB}$$

$$AC = \sqrt{4 + 36} = 2\sqrt{10}$$

$$\text{So, } CB = 6\sqrt{10}$$

$$AB = \sqrt{20 + 60} = \sqrt{80} = 4\sqrt{5} = \text{Diameter}$$

Area of semicircle

$$= \frac{1}{2} \times \pi \times 2\sqrt{5} \times 2\sqrt{5} = 50\pi$$

Option B



22. Solution:

Task 2 can be assigned in 2 ways

(either to person 3 or person 4).

Task 1 can then be assigned in 3 ways (persons 3 or 4, 5 and 6)

The remaining 4 tasks can be assigned to the remaining 4 persons in $4! = 24$ ways

The assignment can be done in $24 \times 2 \times 3 = 144$ ways

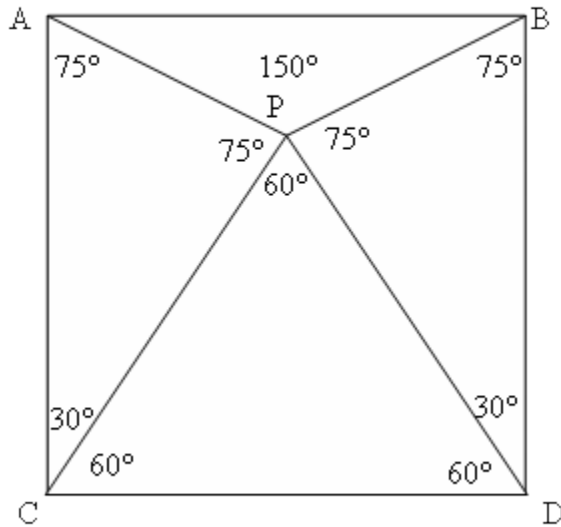
Hence, option A.

23. Solution:

Sum total of option E only gives a prime number hence is the correct answer.

24. **Solution:** Option E

25. Solution:



In the given figure

PCD is the equilateral triangle

ABCD is the square

$AB = BD = CD = AC = PC = PD$

In $\triangle APC$

As $AC = PC$

So, $\angle CAP = \angle CPA = 75^\circ$

Similarly angles B and P of triangle BPD can be proved to be of 75°

This gives the value of required angle as follows:

$$\angle APB = 360^\circ - (75^\circ \times 2 + 60^\circ) = 150^\circ$$

Option E