

General Studies Paper II (CSAT)

for

Civil Services Examinations



Australia • Brazil • India • Mexico • Singapore • United Kingdom • United States



**General Studies
Paper II (CSAT)
for
Civil Services
Examinations**

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PREFACE

If you ever happen to be walking down the streets of places where preparation for Civil Services is done, it will not be uncommon for you to come across or make the acquaintance of 'several' starry eyed yet completely committed IAS aspirants. Yet, 'several' would be an understatement given the number that runs into lakhs! But when we say committed, we mean it; these young men and women are ready to sacrifice almost all their youthful follows including sleep, comfort and even a semblance of a normal life to achieve one goal—IAS!

Sadly, this dream remains a distant one for a large majority of these aspirants in spite of the endless hours of study and sleep forsaken nights. When we tried to unravel WHY, the responses were almost synchronous:

“The subject was so vast that there was too much to cover and I could never complete it.”

“I read so much but could not retain it.”

“I studied something but was quizzed on something else in the exam.”

“I kept reading but did not attempt to solve the past year papers or give a mock exam.”

“Subscribing to several sources of information/preparation such as a coaching class, the internet and books was futile; after all there are only 24 hours in a day.”

“My almirah was full of too many books, but I could barely complete a few.”

And while the candid answers stated above clearly gave us a challenging problem—we did not attempt to solve it. We instead focused on a holistic solution—the synchronizing of effort i.e. Learning and Positive Results!

It is with this aim that we—PrepMate collaborated with Cengage India—are continuously striving to develop a comprehensive learning model that is a combination of online and offline so as to effectively address the issues that most aspirants grapple with.

About the Online–Offline Learning Model

The learning model initiates the process with a series of books targeted at cracking the UPSC exam. The books stand apart from others available because of the following unique features:

- We use a conceptual approach, simple language, explain concepts with diagrams, cite sufficient examples, pose pertinent questions in a reader friendly format—to ensure that the contents of these books can be read and assimilated in a time-bound manner.
- The content is specially designed taking into account the trend in UPSC exams in recent years.

- The Practice Questions at the end of each chapter are exhaustive to provide sufficient preparation to crack the exams.
- We have tried to encapsulate all that is required to be learnt for a particular subject into a single book.

Usually, an aspirant purchases a book, but never gets a chance to contact the authors. We believe that the contact among aspirants and authors is important for learning and motivation of the aspirants. That is precisely why we have developed an application and a web portal to answer your queries and provide you with continuous support during your preparation.

It is through this online system that we provide the following services:

1. Videos covering important and difficult topics
2. Daily prelims quiz
3. Assistance in interview preparation
4. Regular updates
5. Daily current affairs
6. Monthly current affairs magazine
7. Radio news analysis
8. Educational videos
9. Previous years' papers and solutions
10. Free study materials

Looking forward to being your partner in the journey towards achieving your dream!

In case you have any specific queries or constructive feedback you can always share the same with us via e-mail at info@prepmate.in.

PrepMate

ACKNOWLEDGEMENTS

“We cannot accomplish all that we want to do without working together”

The complete UPSC learning module by PrepMate has been the culmination of more than a year of ideation and brain storming with a lot of people. It is only natural that we should gratefully acknowledge their valuable contribution sincerely. Nirmal Singla, Ramnik Jindal, Sharat Gupta, Subhash Singla and Vijay Singla—thank you for your continuous support and motivation.

We would also like to thank Maninder Mann, Rajinder Paul Singla and Sundeep Singh Garha who helped us in first conceiving and later developing the synergistic online–offline model of the project—without you we would be missing our competitive edge.

Implementation of strategy can more often than not prove challenging and the development of the online module did prove to be tougher than we had envisaged. But our technical team was focused on enabling our dream and delivering the best and they surely did. With a specific mention to the testing of both the website and the application, we would like to thank Parth, Tanvir and Surabhi who did their job patiently and effectively in spite of the road blocks.

Our videos and books could not have been possible without the help of our graphics design team—Sandeep, Manjeet, Sukhjinder, Roshni and Uday toiled endlessly to ensure the best designed audio-visuals.

It is an understatement to state that the sourcing and reviewing of existing content and the generation of missing content was the most crucial part of this project and the backbone of our Learning Module. This would just not have been possible without our team of content contributors: Isha Gupta, Shelly Jindal, Gurdeep, Surabhi, Shantnu, Tanvir, Anmol, Kriti, Tanya, Sahil, Suraj and Dilshad, who left no stone unturned in their pursuit of excellence—your pivotal contributions are gratefully acknowledged.

We would like to extend a special thanks to our staff members Geeta, Jitender, Manoj and Pinki, who helped us in the most laborious job i.e. typing through the several manuscripts of our books—your contribution is sincerely appreciated.

It is imperative that we thank Isha Gupta, Shelly Jindal, Anjum Diwan, Rajesh Goel, Shikha Sharma and Ravinder Indoura, for their critical yet constructive feedback that identified and subsequently rectified the errors that crept in during the development process. We will never be able to thank them enough for this—you fortified the very foundation of our model.

We sincerely acknowledge the initiatives and support from the entire editorial team of Cengage India in the process of publishing this book.

PrepMate

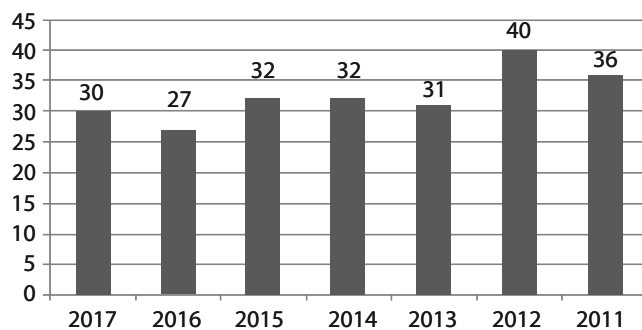
LIST OF VIDEOS

1.	Introduction to Reading Comprehension
2.	Introduction to General Mental Ability and Basic Numeracy
3.	Are You Afraid of Maths?
4.	Introduction to Reasoning
5.	Why Reasoning Is Everyone's Cup of Tea?
6.	How to Solve Puzzles?
7.	Introduction to Data Interpretation

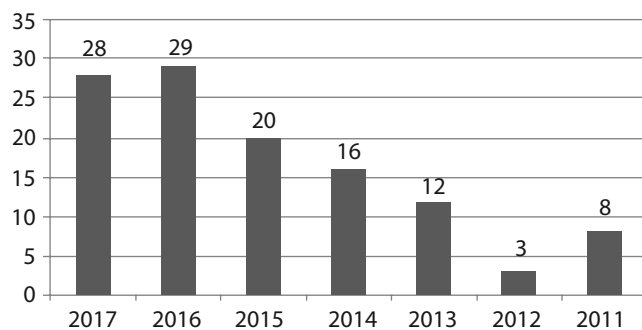
Number of Questions Asked From Various Sections in Previous Years' CSAT

Topic	2017	2016	2015	2014	2013	2012	2011
Reading Comprehension	30	27	32	32	31	40	36
General Mental Ability and Basic Numeracy	28	29	20	16	12	03	08
Data Sufficiency	00	00	00	00	00	00	00
Reasoning	22	24	25	26	25	30	19
Data Interpretation	00	00	03	06	06	00	09
Decision Making (including Communication Skills)	00	00	00	00	06	07	08
Total	80	80	80	80	80	80	80

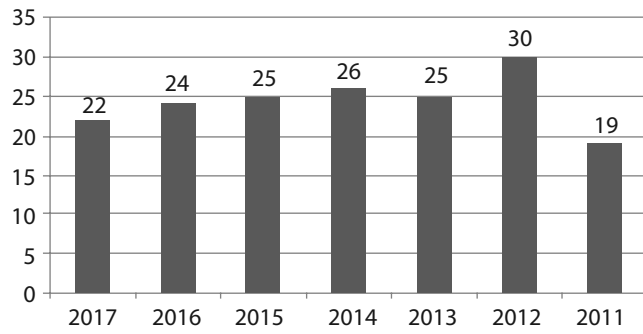
Reading Comprehension



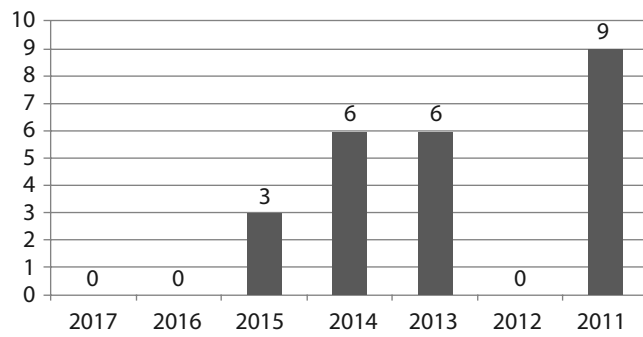
General Mental Ability



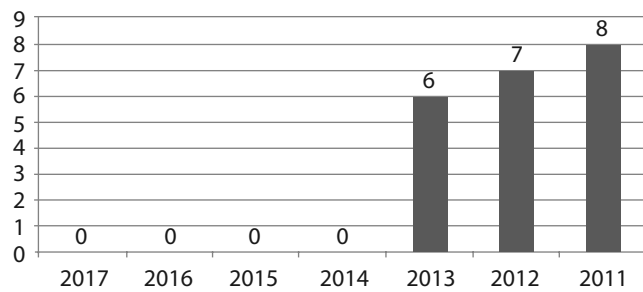
Reasoning



Data Interpretation



Decision Making (Including Communication Skills)



Reasoning, General Mental Ability and Data Interpretation sections can be further analysed.

Topicwise Analysis of Reasoning Questions Asked in Previous Years

Topic	2017	2016	2015	2014	2013	2012	2011
Direction Sense	0	3	2	2	0	0	3
Ranking and Sitting Arrangements	2	3	0	3	3	2	1
Venn Diagrams	0	0	0	0	0	1	0
Sets	0	0	4	2	1	0	5
Deductive Reasoning	2	0	2	0	1	5	4
Verbal Reasoning	4	4	3	5	0	7	0
Blood Relations	1	0	0	0	0	0	0
Coding-Decoding	1	1	1	0	0	0	0
Series	0	0	1	0	0	0	0
Insert the Missing Character	0	0	1	1	2	0	1
Problem Figures	0	0	2	4	4	2	0
Cubes and Dice	0	1	1	0	1	2	0
Analytical Reasoning	0	0	0	0	0	0	2
Puzzles	12	12	8	9	13	11	3
Total	22	24	25	26	25	30	19

Topicwise Analysis of General Mental Ability Questions Asked in Previous Years

Topic	2017	2016	2015	2014	2013	2012	2011
Linear Equations	6	7	6	3	3	0	2
Quadratic Equations	1	0	0	0	0	0	0
Percentages	2	3	3	0	0	0	0
Ratios	2	2	3	0	2	1	0
Profit and Loss	1	2	1	2	0	0	0
Simple and Compound Interest	0	0	0	0	0	0	0
LCM and HCF	0	1	0	2	1	0	1
Speed, Distance and Time	1	2	1	2	3	1	1
Averages	4	3	0	0	0	1	1
Work and Time and Pipes and Cisterns	1	2	1	0	2	0	0
Calendars and Clocks	3	0	1	2	0	0	0

Progressions	2	1	0	2	1	0	1
Two - Dimensional Figures	0	2	0	1	0	0	1
Three - Dimensional Figures	2	2	0	0	0	0	0
Permutations and Combinations	2	1	4	2	0	0	1
Probability	1	1	0	0	0	0	0
Total	28	29	20	16	12	3	8

Topicwise Analysis of Data Interpretation Questions Asked in Previous Years

Topic	2017	2016	2015	2014	2013	2012	2011
Line Graphs	0	0	1	4	0	0	0
Bar Graphs	0	0	1	1	0	0	0
Tabulation	0	0	0	0	0	0	0
Pie Diagrams	0	0	0	0	5	0	2
Miscellaneous Graphs	0	0	1	1	1	0	7
Total	0	0	3	6	6	0	9



Linear equations refer to those equations wherein the unknown variable has the power of 1. For instance, $2x = 6$ is a linear equation as x , the unknown variable, has the power of 1.

Linear equations can be further divided on the basis of the number of unknown variables as follows:

1 LINEAR EQUATIONS IN ONE VARIABLE

The general form of linear equation in one variable (or unknown value) is $ax = b$. In this equation, the value of x is unknown, whereas a and b are constants. For instance, $2x = 6$ is a linear equation in one variable. In this equation, the value of x is unknown.

The value of x can be calculated as follows:

$$2x = 6$$

$$x = \frac{6}{2} = 3$$

2 LINEAR EQUATIONS IN TWO VARIABLES

The general form of linear equation in two variables (or unknown values) is $ax + by + c = 0$. In this equation, values of x and y are unknown, whereas a , b and c are constants. For instance, $2x + 1y + 5 = 0$ is a linear equation in two variables. In this equation, values of x and y are not known, and 2, 1 and 5 are constants.

The golden rule for solving linear equations: The number of equations available to solve for the values of variables, should be equal to or more than the number of variables. For instance, if we have to find out the values of two variables, minimum number of equations required will be two.

Let us now learn how to solve linear equations.

Consider: $2x + 1y - 5 = 0$

$$1x + 1y - 3 = 0$$

The equations can be written as:

$$2x + 1y = 5 \quad (1)$$

$$1x + 1y = 3 \quad (2)$$

Linear equations in two variables can be solved by carrying out mathematical operations on given equations in order to eliminate one variable.

Let us learn from the following examples.

1. If a variable is equal in magnitude in both the equations but it is of opposite sign, then we add both the equations as follows:

$$\text{For instance: } 2x + 1y = 5$$

$$1x - 1y = 3$$

Adding both the equations, we get: $3x = 8$

When one variable is eliminated, the equation can be solved as a linear equation in one variable.

$$\text{Thus, } x = \frac{8}{3}$$

The value of x can be inserted in any of the two equations to calculate the value of y .

$$2 \times \frac{8}{3} + 1y = 5$$

$$y = 5 - \frac{16}{3} = -\frac{1}{3}$$

Let us check the solution.

Put values of x and y in $2x + 1y = 5$ and $1x - 1y = 3$

$$2 \times \frac{8}{3} + 1 \times -\frac{1}{3} = \frac{16}{3} - \frac{1}{3} = 5$$

$$1 \times \frac{8}{3} - 1 \times -\frac{1}{3} = \frac{8}{3} + \frac{1}{3} = 3$$

We find that the left hand side of the equation is equal to the right hand side of the equation. Therefore, values of x and y are correct.

2. If a variable is equal in magnitude in both the equations and the variable possesses the same sign in both the equations, then we subtract one equation from the other equation (or multiply one of the equations by -1) as follows:

$$\text{For instance: } 2x + 1y = 5$$

$$1x + 1y = 3$$

Multiplying the second equation by -1 , we get:

$$2x + 1y = 5$$

$$-1x - 1y = -3$$

Adding both the equations, we get: $x = 2$

Putting $x = 2$ in $1x + 1y = 3$, we get: $y = 1$



If the whole equation is either multiplied or divided by a number, then the value of unknown variables remains the same and the equations are called as a parallel set of equations.

For instance, let two equations be $3x = 9$ and $6x = 18$

If we multiply first equation by 2, we get $2(3x) = 2(9)$ or $6x = 18$

The value of $x = 3$ can be calculated by solving any equation.

3. If both the variables in the given equations are of unequal value, then we multiply or divide either one or both the equations by some number(s) in a way that one variable becomes equal in magnitude in both the equations and then we add or subtract the equations as mentioned in category 1 and 2 above.

For instance: $2x + 1y = 5$

$$3x + 2y = 8$$

In the above equations, if we add or subtract the equations, then one variable will not be eliminated.

Therefore, we multiply the first equation by 2 so that variable y can be eliminated.

The equation becomes: $4x + 2y = 10$

$$3x + 2y = 8$$

Now, subtracting both the equations, we get:

$$x = 2$$

Putting $x = 2$ in $4x + 2y = 10$ or $3x + 2y = 8$, we get:

$$y = 1$$

Solved Examples

1. Solve: $2x + 3y = 7$
 $3x + 2y = 8$

Solution:

Multiply first equation by 3 and second equation by 2, we get:

$$6x + 9y = 21$$

$$6x + 4y = 16$$

Now, subtract both the equations, we get:

$$5y = 5 \Rightarrow y = 1$$

Put $y = 1$ in either $2x + 3y = 7$ or $3x + 2y = 8$, we get

$$x = 2$$

2. Solve: $4x - 5y = 35$
 $3x + 4y = 3$

Solution:

Multiplying the first equation by 3 and the second equation by 4, we get:

$$12x - 15y = 105$$

$$12x + 16y = 12$$

Subtracting both the equations, we get:

$$-31y = 93 \Rightarrow y = -3$$

Putting $y = -3$ in $12x - 15y = 105$

$$12x = 60 \Rightarrow x = 5$$

3. Solve: $6x + 5y = 4$

$$12x + 10y = 8$$

Solution:

If we multiply the first equation by 2, then it becomes exactly the same as the second equation. Thus, both the equations are parallel set of equations. As a minimum of two equations are required to calculate the values of 2 variables, we cannot solve the equation or we can say that there are infinite solutions for the values of x and y .

4. Solve: $\frac{3}{x} + \frac{5}{y} = 1$

$$\frac{4}{x} + \frac{4}{y} = 1$$

Solution:

Let $\frac{1}{x} = a$ and $\frac{1}{y} = b$. Therefore, the equation becomes:

$$3a + 5b = 1$$

$$4a + 4b = 1$$

Multiplying the first equation by 4 and the second equation by 3, we get:

$$12a + 20b = 4$$

$$12a + 12b = 3$$

Subtracting both the equations, we get:

$$8b = 1 \Rightarrow b = \frac{1}{8}$$

Putting $b = \frac{1}{8}$ in $12a + 20b = 4$, we get:

$$12a + 20 \times \frac{1}{8} = 4$$

$$12a = 4 - \frac{5}{2}$$

$$a = \frac{3}{2} \times \frac{1}{12} = \frac{1}{8}$$

$$\text{Now, } \frac{1}{x} = a \Rightarrow \frac{1}{x} = \frac{1}{8} \Rightarrow \text{Therefore, } x = 8$$

$$\text{Similarly, } \frac{1}{y} = b \Rightarrow \frac{1}{y} = \frac{1}{8} \Rightarrow \text{Therefore, } y = 8$$

3 LINEAR EQUATIONS IN THREE VARIABLES

We can solve linear equations in three variables by solving two out of three equations at a time, in a way that one variable gets eliminated. In this way, we will be left with linear equations in two variables.

Let us look at the example:

$$2x + 1y + 1z = 7 \quad (1)$$

$$1x + 2y + 3z = 14 \quad (2)$$

$$2x + 3y + 4z = 20 \quad (3)$$

Let us consider the first and the second equations. If we multiply the first equation by 3, we get:

$$6x + 3y + 3z = 21$$

$$1x + 2y + 3z = 14$$

Subtracting the second equation from the first, we get:

$$5x + y = 7 \quad (4)$$

Now, we take the second and the third equations. We multiply the second equation by 4 and the third equation by 3, we get:

$$4x + 8y + 12z = 56$$

$$6x + 9y + 12z = 60$$

Subtracting the equations, we get:

$$2x + y = 4 \quad (5)$$

From Equations 4 and 5, we can calculate the values of x and y , we get:

$$x = 1 \text{ and } y = 2$$

Put $x = 1$ and $y = 2$ in any of the three equations, we get $z = 3$.

Solved Examples

5. How many pieces of length 80 cm can be cut from a rod which is 40 m long?

Solution:

$$1 \text{ m} = 100 \text{ cm}$$

$$\text{Number of pieces} = \frac{\text{Total Length of the Rod}}{\text{Length of One Piece}} = \frac{40 \times 100}{80} = \frac{4,000}{80} = 50 \text{ pieces}$$

6. A possessed a certain sum of money. He gave one fourth of this sum to B. B in turn gave half of what he received from A to C. If the difference between the remaining amount with A and the amount received by C is ₹2,500, how much money is remaining with A?

Solution:

Suppose A initially possessed ₹ x .

$$\text{Amount received by B} = ₹ \frac{x}{4}$$

$$\text{Amount remaining with A} = ₹ \left[x - \frac{x}{4} \right] = ₹ \frac{3x}{4}$$

$$\text{Amount received by C} = ₹ \left[\frac{1}{2} \times \frac{x}{4} \right] = ₹ \frac{x}{8}$$

$$\frac{3x}{4} - \frac{x}{8} = 2,500 \Rightarrow 5x = 2,500 \times 8 \Rightarrow x = 4,000$$

$$\text{Hence, amount remaining with A} = ₹ \frac{3x}{4} = ₹ 3,000$$

7. A man divides his total property in such a way that half of his property is given to his wife, $\frac{2}{3}$ rd of the remaining property is divided equally among his three sons and the rest of the property is divided equally among his three daughters. If the share of each daughter in the property is worth ₹30 lakhs, then what is the share of each son?

Solution:

Let the total property = x

$$\text{Wife's share} = \frac{1}{2}x$$

$$\text{Remaining share} = \left(1 - \frac{1}{2} \right) x = \frac{1}{2}x$$

$$\text{Share of 3 sons} = \left(\frac{2}{3} \times \frac{1}{2}\right)x = \frac{1}{3}x. \text{ Therefore, each son's share} = \frac{1}{3}x \times \frac{1}{3} = \frac{1}{9}x$$

$$\text{Share of 3 daughters} = \left(\frac{1}{2} - \frac{1}{3}\right)x = \frac{1}{6}x$$

$$\text{Each daughter's share} = \frac{1}{3} \times \frac{1}{6}x = \frac{1}{18}x$$

$$\frac{1}{18}x = ₹30 \text{ lakhs} \leftrightarrow x = 30 \times 18 = ₹540 \text{ lakhs}$$

$$\text{Each son's share} = \frac{1}{9}x = \frac{1}{9} \times 540 = ₹60 \text{ lakhs}$$

8. A man divides ₹8,400 among his 4 sons, 4 daughters and 2 friends. If each daughter receives 6 times as much as each friend and each son receives 4 times as much as each friend, then what is the share of each daughter?

Solution:

Let the share of each friend = ₹ x

Then, share of each daughter = ₹ $6x$; Share of each son = ₹ $4x$

Therefore, $4 \times 6x + 4 \times 4x + 2 \times x = 8,400$

$$24x + 16x + 2x = 8,400$$

$$42x = 8,400, x = 200.$$

Share of each daughter = $6x = 6 \times 200 = ₹1,200$.

9. A man spends $\frac{2}{5}$ th of his salary on house rent, $\frac{3}{10}$ th of his salary on food and $\frac{4}{15}$ th of his salary on miscellaneous items. If after incurring all these expenditures, ₹1,000 are left with him, then find his expenditure on food.

Solution:

Let the total salary of the man be x .

$$\text{Expenditure on house rent} = \frac{2}{5} \times x$$

$$\text{Expenditure on food} = \frac{3}{10} \times x$$

$$\text{Expenditure on miscellaneous items} = \frac{4}{15} \times x$$

$$\text{Part of the salary left} = 1x - \left(\frac{2}{5}x + \frac{3}{10}x + \frac{4}{15}x \right) = 1x - \frac{29x}{30} = \frac{1}{30}x$$

$$\frac{1}{30}x = 1,000 \Rightarrow x = 30,000$$

$$\text{Expenditure on food} = \frac{3}{10} \times x = ₹9,000.$$

10. A stick is painted with different colours. If $\frac{1}{10}$ th of the stick is blue, $\frac{1}{2}$ of the remaining stick is white and the remaining $4\frac{1}{2}$ cm is black, find the total length of the stick.

Solution:

Let the length of the stick = x cm.

$$\text{Then, blue part} = \frac{x}{10} \text{ cm}$$

$$\text{Remaining white and black part} = \left(x - \frac{x}{10} \right) \text{cm} = \frac{9x}{10} \text{cm}$$

$$\text{White part} = \frac{1}{2} \times \frac{9x}{10} \text{cm} = \frac{9x}{20} \text{cm}$$

$$\text{Remaining black part} = \frac{9x}{10} - \frac{9x}{20} \text{cm} = \frac{9x}{20} \text{cm}$$

$$\frac{9x}{20} = 4\frac{1}{2}$$

$$\Rightarrow x = \frac{9}{2} \times \frac{20}{9} = 10 \text{ cm}$$

Hence, the total length of the stick = 10 cm

11. Village A has a population of 36,000 persons, which is decreasing at the rate of 1,200 persons per year. Village B has a population of 12,000 persons, which is increasing at the rate of 800 persons per year. In how many years the population of both the villages will be equal?

Solution:

Let the populations of village A and B be equal after x years.

$$36000 - 1200x = 12000 + 800x$$

$$2000x = 24000$$

$$x = 12$$

Therefore, the population of the two villages will be equal after 12 years.

12. A tin of milk was $\frac{4}{5}$ th full. When 6 bottles of milk were taken out and 4 bottles of milk were poured into it, it was $\frac{3}{4}$ th full. How many bottles of milk can the tin contain?

Solution:

Let the number of bottles that can fill the tin completely be x .

$$\text{Then, } \frac{4}{5}x - \frac{3}{4}x = (6 - 4)$$

$$\Rightarrow \frac{x}{20} = 2 \Rightarrow x = 40$$

Therefore, the required number of bottles to fill the tin is 40.

13. Two pens and three pencils cost ₹86. Four pens and a pencil cost ₹112. Find the cost of a pen and a pencil.

Solution:

Let the cost of a pen and a pencil be ₹ x and ₹ y , respectively.

$$\text{Then, } 2x + 3y = 86 \text{ and } 4x + y = 112$$

Solving both the equations, we get: $x = 25$ and $y = 12$

\therefore Cost of a pen = ₹25 and cost of a pencil = ₹12

14. A possessed 75 currency notes, either of ₹100 or ₹50. The total amount of all these currency notes was ₹5,000. How many notes of ₹50 were possessed by A?

Solution:

Let the number of 50 rupee notes possessed by A be x .

Then, the number of 100 rupee notes = $75 - x$

$$50x + 100(75 - x) = 5,000$$

$$50x = 2,500 \Rightarrow x = 50$$

Therefore, A possessed 50 notes of ₹50.

15. An employer pays ₹20 for each day a worker works, and fines ₹3 for each day when the worker is absent. At the end of 60 days, the worker is paid ₹280. For how many days was the worker absent?

Solution:

Suppose the worker was absent for x days. He worked for $(60 - x)$ days.

$$20(60 - x) - 3x = 280$$

$$\Rightarrow 1200 - 23x = 280$$

$$\Rightarrow 23x = 920$$

$$\Rightarrow x = 40$$

Therefore, the worker was absent for 40 days.

16. One third of A's marks in General Studies exceeds one half of B's marks in General Studies by 60. If A and B together scored 480 marks, then how many marks did B score in General Studies?

Solution:

Let A's and B's marks in General Studies be x and y , respectively.

$$\text{Then, } \frac{1}{3}x - \frac{1}{2}y = 60 \leftrightarrow 2x - 3y = 360 \quad (\text{i})$$

$$x + y = 480 \quad (\text{ii})$$

Solving (i) and (ii), we get: $x = 360$ and $y = 120$

Thus, B scored 120 marks.

17. There is one overripe apple for every 20 apples in a crate of apples. If 3 out of every 4 overripe apples are considered unsaleable and there are 12 unsaleable apples in the crate, then how many apples are there in the crate?

Solution:

Let the total number of apples in the crate = x

$$\text{Number of overripe apples} = \frac{1}{20}x$$

$$\text{Number of unsaleable apples} = \left(\frac{3}{4} \times \frac{1}{20}x \right) = \frac{3}{80}x$$

$$\frac{3}{80}x = 12$$

$$\Rightarrow x = 320$$

18. In a circus, in addition to 40 hens there are 45 dogs and 8 lions with some keepers (men in-charge of animals). If the total number of feet is 210 more than the number of heads, find the number of keepers.

Solution:

Let the number of keepers = x .

$$\text{Total number of heads} = (40 + 45 + 8 + x) = (93 + x)$$

$$\text{Total number of feet} = (45 + 8) \times 4 + (40 + x) \times 2 = (292 + 2x)$$

$$(292 + 2x) - (93 + x) = 210 \Rightarrow x = 11$$

Therefore, the number of keepers = 11

19. In a certain office one third of the workers are women, half of the women are married and half of the married women have children. If half of the men are married and one third of the married men have children, what part of the total number of workers is without children?

Solution:

Let the total number of workers = x

$$\text{Number of women workers} = \frac{x}{3} \text{ and number of men workers} = \left(x - \frac{x}{3}\right) = \frac{2x}{3}$$

$$\text{Number of women workers with children} = \frac{1}{2} \times \frac{1}{2} \times \frac{x}{3} = \frac{x}{12}$$

$$\text{Number of men workers with children} = \frac{1}{3} \times \frac{1}{2} \times \frac{2x}{3} = \frac{x}{9}$$

$$\text{Number of workers with children} = \left(\frac{x}{12} + \frac{x}{9}\right) = \frac{7x}{36}$$

$$\text{Number of workers without children} = \left(x - \frac{7x}{36}\right) = \frac{29x}{36}$$

Therefore, $\frac{29}{36}$ th part of the workers is without children.

20. An amount was distributed equally among 14 boys, each boy got ₹80 more than that when the same amount was distributed equally among 18 boys. What was the amount which was distributed?

Solution:

Let the total amount be ₹ x .

$$\text{Then, } \frac{x}{14} - \frac{x}{18} = 80 \Rightarrow \frac{2x}{126} = 80 \Rightarrow \frac{x}{63} = 80 \Rightarrow x = 63 \times 80 = 5,040$$

Hence, total amount = ₹5,040.

21. A bus started with a certain number of passengers on board. At the first stop, one third of the passengers got down from the bus and 30 new passengers boarded the bus. At the second stop, one half of the new total number of passengers got down from the bus and 5 new passengers boarded the bus. As it reached the third stop, it had 40 passengers on board. Find the number of passengers in the bus when it just started.

Solution:

Let the number of passengers in the bus in the beginning be x .

$$\text{After the first stop, number of passengers} = \left(x - \frac{x}{3}\right) + 30 = \left(\frac{2x}{3} + 30\right)$$

$$\text{After the second stop, number of passengers} = \frac{1}{2}\left(\frac{2x}{3} + 30\right) + 5$$

$$\frac{1}{2}\left(\frac{2x}{3} + 30\right) + 5 = 40$$

$$\Rightarrow \frac{2x}{3} + 30 = 2 \times 35$$

$$\Rightarrow \frac{2x}{3} = 70 - 30$$

$$x = \left(40 \times \frac{3}{2}\right) = 60$$

Therefore, the number of passengers on board when the bus just started was 60.

22. A party was attended by both men and women. After some time, 10 women left the party. The ratio of remaining men and women was 2 : 1. Thereafter, 25 men left the party. Now, the ratio of remaining men and women is 1 : 3. Find the initial number of women at the party.

Solution:

Let the initial number of men at the party = x

Let the initial number of women at the party = y

Number of women present in the party after 10 women left the party = $y - 10$

Given that $x = 2(y - 10)$

Number of men after 25 men left the party = $2(y - 10) - 25$

Given that $3 [2(y - 10) - 25] = y - 10$

$$y = 25$$

Hence, the initial number of women at the party = 25

23. Both A and B possess some money. If A gives ₹30 to B, then B will have twice the sum of money as much as left with A. But, if B gives ₹10 to A, then A will have thrice the sum of money as much as left with B. How much money was initially possessed by A?

Solution:

$$2(A - 30) = B + 30 \Rightarrow 2A - B = 90 \quad (1)$$

$$A + 10 = 3(B - 10) \Rightarrow A - 3B = -40 \quad (2)$$

Solving Equations (1) and (2), we get: $A = 62$ and $B = 34$

Therefore, A initially possessed ₹62.



Note: It is important to learn how to solve the linear equations because under various topics of GMA, the candidate is required to solve the questions with the help of linear equations.

Practice Exercise

- If one third of a tank can hold 80 L of water, then the quantity of water, one half of the tank can hold is:
 - 100 L
 - 120 L
 - 240 L
 - None of the above
- A tank is $\frac{2}{5}$ th full. If 16 litres of water is added to the tank, then it is $\frac{6}{7}$ th full. The capacity of the tank is:

(a) 30 L	(b) 35 L
(c) 40 L	(d) 42 L
- A bucket full of fluid can fill either three large bottles or seven small bottles. One large bottle is filled with fluid and used to fill an empty small bottle. What part of the large bottle contains fluid after filling one small bottle?
 - $\frac{3}{7}$
 - $\frac{4}{7}$
 - $\frac{4}{21}$
 - None of the above
- A person travels 3.5 km from place A to place B. Of this distance, he travels $1\frac{2}{3}$ km by bicycle, $1\frac{2}{3}$ km by scooter and the rest of the distance on foot. How much distance does he travel on foot?

- (a) $\frac{1}{3}$ km
(b) $\frac{1}{6}$ km
(c) $\frac{1}{9}$ km
(d) None of the above
5. A 70 cm long wire is cut into two parts such that one part is two fifth of the other part. What is the length of the longer part?
(a) 40 cm
(b) 42 cm
(c) 50 cm
(d) None of the above
6. The number of students in each section of a school was 22. After admitting new students, two new sections were started. Now, the total number of sections is 16 and there are 21 students in each section. The number of new students admitted is:
(a) 24 (b) 28
(c) 42 (d) 44
7. A school starts at 9 a.m. and lasts till 1 : 30 p.m. Four periods are held for each class during this time period. After every period, a 10 min break is given to the students. The exact duration of each period is:
(a) 57.5 min
(b) 1 h
(c) 1 h 7.5 min
(d) None of the above
8. A light was seen at an interval of every 9 sec. It was seen for the first time at 2 : 02 : 54 p.m. and for the last time at 3 : 18 : 12 p.m. How many times was the light seen?
(a) 496 (b) 498
(c) 502 (d) 503
9. An apple costs ₹7 each. A mango costs ₹5 each. Mr. X spends ₹38 on purchasing apples and mangoes. The number of mangoes purchased by Mr. X was:
(a) 2
(b) 3
(c) 4
(d) Data inadequate
10. The number of girls in a class is 4 times the number of boys. Which of the following can be the total number of children in the class?
(a) 24 (b) 28
(c) 35 (d) 41
11. A man earns ₹20 on the first day and spends ₹15 on the next day. He earns ₹20 again on the third day and spends ₹15 on the fourth day. If he continues to earn and spend like this, how soon will he have ₹50 with him?
(a) 10th day
(b) 13th day
(c) 20th day
(d) None of the above
12. Along a park 225 m in length, 26 trees are planted at equal distances in a way

that one tree is planted at each end of the park. What is the distance between two consecutive trees?

- (a) 8.65 m (b) 9 m
(c) 9.5 m (d) 10 m

13. In a class, $\frac{3}{5}$ th of the students are girls and the rest of the students are boys. If $\frac{3}{5}$ th of the girls and $\frac{2}{5}$ th of the boys are absent, what part of the total number of students are present?

- (a) $\frac{12}{25}$
(b) $\frac{13}{25}$
(c) $\frac{1}{2}$
(d) None of the above

14. To win an election, a candidate needs a minimum of half of the total votes casted. If after two thirds of the votes have been counted, the candidate has half of what is required to win the election, then what part of the remaining votes does the candidate need to win the election?

- (a) $\frac{1}{3}$
(b) $\frac{2}{3}$
(c) $\frac{3}{4}$
(d) None of the above

15. One test tube contains some acid and another test tube contains an equal quantity of water. To prepare a solution, 20 ml of acid is poured into the second test tube from the first test tube. Then, two third of the solution so-formed was poured from the second test tube into the first. If the solution in the first test tube is 4 times that in the second, then what quantity of water was taken initially in the first test tube?

- (a) 40 ml (b) 60 ml
(c) 80 ml (d) 100 ml

16. There are two examination rooms A and B. If 10 students are shifted from A to B, then the number of students in each room is the same. If 20 candidates are shifted from B to A, then the number of students in A is double the number of students in B. The number of students in room A is:

- (a) 50 (b) 80
(c) 90 (d) 100

17. N number of persons contributed equally to raise ₹3 lakhs. Had each person contributed ₹500 extra, the total contribution would have been ₹5.5 lakhs. How many persons contributed the money?

- (a) 450
(b) 475
(c) 500
(d) Data inadequate

18. Eight persons equally share the cost of renting a car. If one person withdraws

from the agreement and the others agree to share the entire cost of renting the car equally, then the share of each of the remaining persons increases by what part of his or her original share:

- (a) $\frac{1}{7}$
 (b) $\frac{1}{8}$
 (c) $\frac{1}{56}$
 (d) None of the above

19. In a classroom, if 6 students sit on every bench, then 1 more bench is required to accommodate all the students. However, if 7 students sit on every bench, then there is space for 5 more students. What is the number of students in the class?

- (a) 11
 (b) 56
 (c) 72
 (d) None of the above

20. In a certain shop 6 oranges cost as much as the cost of 5 apples, 5 apples cost as much as the cost of 3 mangoes

and 3 mangoes cost as much as the cost of 6 bananas. If 3 bananas cost ₹4.80, the price of an orange is:

- (a) ₹1.20 (b) ₹1.50
 (c) ₹1.60 (d) ₹2.00

21. It costs ₹ x per shirt to stitch the first thousand shirts and ₹ y to stitch each subsequent shirt. If z is greater than 1,000, how much will it cost to stitch z number of shirts?

- (a) $x + zy - 1000y$
 (b) $1,000(x - y) + yz$
 (c) $1,000(z - y) + xz$
 (d) $1,000x + yz$

22. The taxi charges for a journey comprises a fixed charge and a variable charge which is according to the distance covered. For a journey of 15 km, the charges paid are ₹125 and for a journey of 25 km, the charges paid are ₹175. What are the taxi charges for a journey of 30 km?

- (a) ₹180
 (b) ₹200
 (c) ₹225
 (d) None of the above



ANSWER KEYS

Practice Exercise

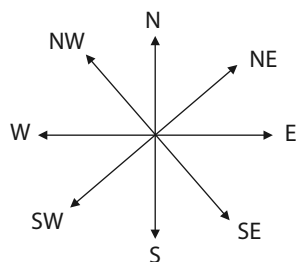
1. (b)	2. (b)	3. (b)	4. (b)	5. (c)
6. (b)	7. (b)	8. (d)	9. (a)	10. (c)
11. (b)	12. (b)	13. (a)	14. (c)	15. (d)

16. (d)	17. (c)	18. (a)	19. (c)	20. (c)
21. (b)	22. (b)			



This chapter tests a candidate's direction sense. The candidate is required to read a series of instructions relating to an object which is constantly changing directions, and then either determine the final direction in which the object is travelling or the distance travelled by the object (usually from the starting point).

The figure given below indicates the positions of various directions and will help the candidate to develop a direction sense.



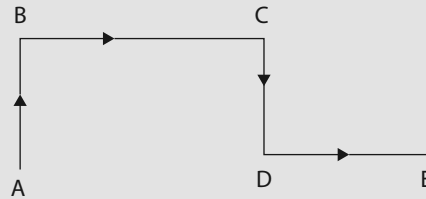
Solved Examples

1. A person travels in the north direction, then turns right, then again turns right and thereafter turns left. In which direction is the person travelling now?
(a) North (b) South (c) East (d) West

Solution: (c) East

Explanation:

The movement of the person is indicated in the figure given below (from A to B, B to C, C to D and D to E). The final movement is in the direction indicated by the line segment DE, which is towards the East direction.

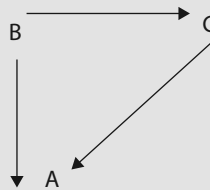


2. If A is to the south of B and C is to the east of B, what is the direction of A with respect to C?
 (a) North-east (b) South-east (c) North-west (d) South-west

Solution: (d) South-west

Explanation:

From the figure given below, A is south-west of C.

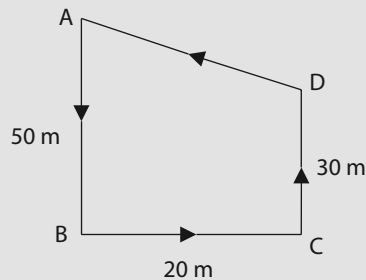


3. A runs 50 m south from her house. Then, she turns left and runs 20 m more, then she turns towards the north and runs 30 m further and finally starts walking towards her house on the shortest possible route. In which direction is she walking now?
 (a) West (b) South-east (c) North-west (d) None of the above

Solution: (c) North-west

Explanation:

The movement of A is shown in the figure given below (A to B, B to C, C to D and D to A). She is walking from D to A in the north-west direction.



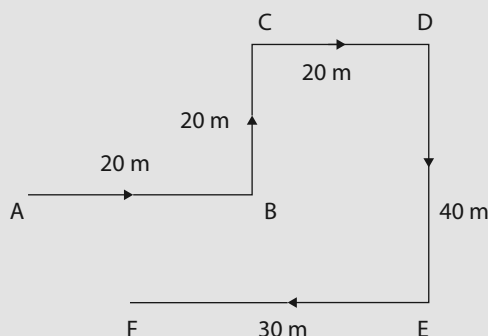
4. P is facing the north direction. He then turns right and walks 20 m. He then turns to his left and walks 20 m. Next, he moves 20 m to his right. He then turns to his right again and walks 40 m. Finally, he turns to his right and moves 30 m. In which direction is he now with respect to his starting point?

(a) South-west (b) South (c) North-west (d) South-east

Solution: (d) South-east

Explanation:

Let us assume that P starts from point A. He turns right and walks 20 m towards east up to point B, turns left and moves 20 m up to point C, turns right and moves 20 m up to point D. At D where he is facing east, he takes a right turn and turns towards south and walks 40 m up to E. Next, he turns right again and walks 30 m up to F, his final position. F is south-east of A. Therefore, P is south-east of his starting point.



5. A direction pole was situated on a crossing. Due to an accident the pole turned in such a manner that the pointer which indicated east direction, was now pointing towards the south. According to the pointer, one traveller was travelling in the north direction. In which direction was he actually travelling?

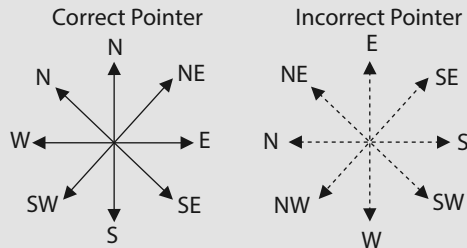
(a) North (b) South (c) East (d) West

Solution: (d) West

Explanation:

The directions on the correct pointer and the incorrect pointer are shown in the figure given below.

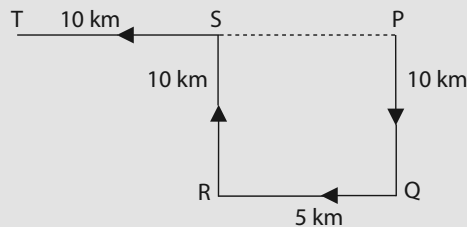
The north direction according to the incorrect pointer is actually the west direction.



6. One day, A left home and cycled 10 km southwards, turned right and cycled 5 km, turned right again and cycled 10 km and finally, turned left and cycled 10 km. What is the minimum distance A is required to travel to reach back home from this point?
- (a) 10 km (b) 15 km (c) 20 km (d) None of the above

Solution: (b) 15 km

Explanation:



A starts from point P (home), moves 10 km southwards up till Q, turns right and moves 5 km up till R, turns right again and moves 10 km up till S and finally turns left and moves 10 km up till T.

A's distance from the initial position = $PT = PS + ST = QR$ (because $PS = QR$) + ST
 $= 5 \text{ km} + 10 \text{ km} = 15 \text{ km}$.

7. A person walks 9 km towards the north. From there he walks 5 km towards the South. Then, he walks 3 km towards east. How far and in which direction is he with respect to his starting point?
- (a) 5 km north-east (b) 7 km north-east
 (c) 5 km south-west (d) 5 km south-west

Solution: (a) 5 km North-east

Explanation:

The person walks 9 km northwards from A to B, then walks 5 km southwards up to C, then turns towards east and walks 3 km up to D.

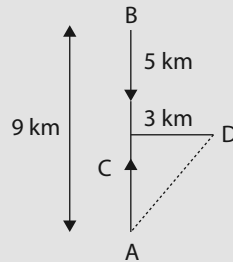
Then, $AC = (AB - BC) = (9 - 5) = 4$ km

$CD = 3$ km

Distance from the starting point = $\sqrt{AC^2 + CD^2} = \sqrt{4^2 + 3^2} = 5$ km

Also, D is north-east of A

Therefore, choice (a) is the correct answer.



8. Two cars start moving towards each other from two opposite points 150 km apart on a main road. The first car covers 25 km on the main road, takes a right turn and then covers 25 km more. It then turns left and covers another 25 km and then turns to reach the main road. In the meantime, due to a minor breakdown, the other car covers only 40 km along the main road. What is the remaining distance between the two cars?

(a) 35 km (b) 50 km (c) 60 km (d) None of the above

Solution: (c) 60 km

Explanation:

Let X and Y be two cars.

Car X travels along the path PA, AB, BC and CD.

Now, $AD = BC = 25$ km.

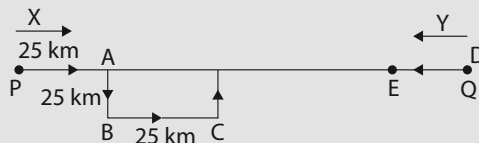
Distance travelled by car X on the main road = PD

$PD = PA + AD = 50$ km

Distance travelled by car Y = $QE = 40$ km

Therefore, the distance between the two cars = $PQ - (PD + QE)$

$$= [150 - (50 + 40)] \text{ km} = 60 \text{ km}$$



Practice Exercise

- A is 50 m South-west of B. C is 50 m South-east of B. Then, what is the direction of C with respect to A?
 - North
 - East
 - North-east
 - None of the above
- A person walks 40 m in the north-west direction from his house and then walks 40 m in the South-west direction. Next, he walks 40 m in the south-east direction. Finally, he starts walking towards his house. In which direction is he moving?
 - North-east
 - South-east
 - South-west
 - None of the above
- There are four towns P, Q, R and T. Q is situated at the south-west of P, R is at the east of Q and south-east of P, and T is at the north of R. In which of the following direction T **cannot** be located with respect to P?
 - North
 - East
 - North-east
 - South-east
- S starts walking towards east. After walking 125 m, he turns left and walks 25 m. He turns left again, walks a distance of 80 m, he turns left again and walks 25 m. How far is he from the starting point?
 - 25 m
 - 35 m
 - 40 m
 - 45 m
- A boy started travelling from his house towards the market located 5 km away in the north-east direction. From there he went to his friend's house situated 4 km south of the market. How far and in what direction is he from his house?
 - 3 km in North
 - 3 km in East
 - 4 km in East
 - 4 km in West
- A lady lost her purse. She went 90 m east to a shop before turning to her right. She went 20 m ahead again before turning to her right. Thereafter, she walked 30 m further to reach his uncle's place. From there, she went 100 m north to a street where she found her purse. How far from the starting point did she find her purse?
 - 60 m
 - 100 m
 - 140 m
 - None of the above
- Two cars, X and Y, 100 km apart start moving towards each other with the same speed on a main road. After covering 30 km, car Y turns left and covers 10 km and then turns right and covers 20 km. Then, it turns right again and comes back on the main road. In the meantime, car X continues to move on the main road. What is the final distance between the two cars?

- (a) 10 km (b) 15 km
 (c) 20 km (d) 25 km

8. Directions (8.1–8.2): Study the information given below and answer the questions that follow:

A, B, C, D, E, F, G, H and I are nine general merchandise stores in an area. C is 4 km east of B. A is 2 km north of B and H is 4 km south of A. G is 2 km west of H, whereas D is 6 km east of G

and F is 4 km north of G. I is situated in the middle of B and C, whereas E is situated in the middle of H and D.

- 8.1. The distance between E and G is

- (a) 2 km (b) 3 km
 (c) 4 km (d) 5 km

- 8.2. The distance between E and I is

- (a) 2 km (b) 4 km
 (c) 6 km (d) 8 km



ANSWER KEYS

Practice Exercise

1. (b)	2. (a)	3. (a)	4. (d)	5. (b)
6. (b)	7. (c)	8.1 (c)	8.2 (a)	

Solutions for
READING
COMPREHENSION

PASSAGE 1

1. **Solution: (b) It is a suggestion to others to indulge in work.**

Explanation:

This is a “meaning of a particular detail” in the passage type question. This type of question requires the candidate to evaluate whether the statements mentioned in the question reflect the meaning of the information stated in the question stem.

To answer such questions, read the information (the meaning of which has been asked) in the passage and identify the meaning of the information.

The passage states that workmanship is the best gift one can ever give to oneself and then the passage suddenly raises a question to the reader to try workmanship. Therefore, the phrase ‘why not try it’ means that the author is suggesting others to indulge in work.

PASSAGE 2

1. **Solution: (d) The youth was poisoned.**

Explanation:

This is a ‘simple specific detail’ question and requires one to find a single detail mentioned in the passage. The question requires an evaluation of various statements (hypotheses) and also an identification of the statement which was not formed to explain the youth’s collapse.

Choices (a), (b), and (c) are mentioned in the passage as the hypotheses formed by people to explain the incident. Therefore, choice (d) is the correct answer.

PASSAGE 3

1. **Solution: (c) Fight to survive.**

Explanation:

This is a ‘meaning of particular detail in the passage’ type question. This type of a question requires the candidate to evaluate whether the statements mentioned in the question reflect the meaning of the information stated in the question stem.

The ‘fight’ mentioned in the passage is the fight against being engulfed by the fire and, therefore, is a fight to survive.

PASSAGE 4

1. **Solution: (c) Like any other society, differences of opinion exist in the Indian society as well.**

Explanation:

This is a ‘meaning of a particular detail in the passage’ type question. This type of question requires the candidate to evaluate whether the statements mentioned in the question reflect the meaning of the information stated in the question stem.

To answer such questions, one should read the information (the meaning of which has been asked) in the passage and identify the meaning of the information. Furthermore, to identify the meaning of the information, one should refer to that part of the passage which consists of the statement given in context of the information asked in the question.

The author uses the expression ‘The Indian society stands no different’ to signify that the difference of opinion exists between the youth and the aged in the Indian society as well.

Solutions for
DECISION MAKING

PRACTICE EXERCISE-1

1. **Solution: (d) Attend the wedding**

Explanation:

The situation requires respect for the feelings of the maid who is inviting you to the marriage of her daughter.

Choice (d) is the most appropriate answer. The feelings of the maid should be given due respect by attending the wedding. One should be respectful towards the feelings of the people who engage in professions which are often less paid and are not looked at in a dignified manner in the society.

Choice (a) is incorrect as it reflects lack of your concern for the feelings of the maid.

Choice (b) is incorrect as giving money is not a substitute for attending the wedding and will still reflect lack of respect for the feelings of the maid.

Choice (c) is incorrect as making excuses in front of other people reduce the credibility of a person.

2. **Solution: (c) Decide that you cannot afford it**

Explanation:

The situation ascertains the way you act when your desire is beyond your means.

Choice (c) is the most appropriate because it is important for an individual to overcome his desire when the desire is beyond the means of an individual.

Choice (a) is inappropriate because it reflects the tendency to make compromises for satisfying the desires.

Choice (b) is inappropriate because it reflects the tendency to go beyond one's means to satisfy desires.

Choice (d) is inappropriate though more appropriate than choice (a) and (b) because it reflects a prolonged effect of desire on the behaviour and limited tendency to overcome one's desires.

3. **Solution: (c) Collect the necessary information about his destination and guide him accurately**

Explanation:

The situation tests how much are you socially responsible especially when you are under pressure.

Opportunity to help the old man examines the sense of social responsibility in a person. When one is getting late, then he or she is under pressure and often ignores social responsibilities.

Choice (c) is the most appropriate response because a person should fulfill his or her social responsibility even under pressure.

Choices (b) and (d) are inappropriate as the old man has only lost his way. This does not mean that he needs money or help of the police.

Choice (a) is inappropriate because it reflects the lack of social responsibility in the person.

4. **Solution: (d) Contact the club authorities and make an announcement for the parents**

Solutions for

**GENERAL MENTAL
ABILITY AND BASIC
NUMERACY**

1. LINEAR EQUATIONS

1. **Solution: (b) 120 L**

Explanation:

Let the capacity of the tank = x L

$$\text{Then, } \frac{1}{3}x = 80 \Rightarrow x = 240 \text{ L}$$

$$\text{Therefore, } \frac{1}{2}x = 120 \text{ L}$$

2. **Solution: (b) 35 L**

Explanation:

Let the capacity of the tank = x L

$$\text{Then, } \frac{6}{7}x - \frac{2}{5}x = 16$$

$$\Rightarrow 30x - 14x = 16 \times 35$$

$$\Rightarrow 16x = 16 \times 35$$

$$\Rightarrow x = 35 \text{ L}$$

3. **Solution: (b) $\frac{4}{7}$**

Explanation:

Let the capacity of the bucket be 1 unit of fluid.

$$\text{Then, capacity of 1 large bottle} = \frac{1}{3}$$

$$\text{Capacity of 1 small bottle} = \frac{1}{7}$$

Fluid left in the large bottle after filling the

$$\text{small bottle} = \left(\frac{1}{3} - \frac{1}{7} \right) = \frac{4}{21}$$

$$\text{Part of the large bottle remaining} = \frac{\frac{4}{21}}{\frac{1}{3}} = \frac{4}{7}$$

4. **Solution: (b) $\frac{1}{6}$ km**

Explanation:

Distance travelled on foot =

$$\left[\frac{7}{2} - \left(\frac{5}{3} + \frac{5}{3} \right) \right] \text{ km} = \left(\frac{7}{2} - \frac{10}{3} \right) \text{ km} = \frac{1}{6} \text{ km}$$

5. **Solution: (c) 50 cm**

Explanation:

Let the length of the longer piece = x cm

$$\text{Then, length of the shorter piece} = \left(\frac{2}{5}x \right)$$

$$\text{Therefore, } x + \frac{2}{5}x = 70 \Rightarrow \frac{7x}{5} = 70$$

$$\Rightarrow x = \left(\frac{70 \times 5}{7} \right) = 50 \text{ cm}$$

6. **Solution: (b) 28 students**

Explanation:

$$\text{Original number of sections} = (16 - 2) = 14$$

$$\text{Original number of students} = (22 \times 14) = 308$$

$$\text{Present number of students} = (21 \times 16) = 336$$

Number of new students admitted

$$= (336 - 308) = 28 \text{ students.}$$

7. **Solution: (b) 1 h**

Explanation:

Total time available between 9 a.m. and 1:30 p.m. = 4 h 30 min.

Total number of breaks in between the four periods = 3

$$\text{Total duration of the breaks} = 3 \times 10 = 30 \text{ min}$$

$$\text{Total duration of four periods} = 4 \text{ h } 30 \text{ min} - 30 \text{ min} = 4 \text{ h.}$$

$$\text{Therefore, Duration of each period} = \frac{4}{4} = 1 \text{ h.}$$

8. **Solution: (d) 503**

Explanation:

H	Min	S
3	18	12
-2	-02	-54
1	15	18

Solutions for
DATA SUFFICIENCY

PRACTICE EXERCISE – 1

1. **Solution: (a) Statement I alone is sufficient to answer the question.**

Explanation:

Let the two numbers be x and y

Statement I denotes $x + y = 2(x - y) \Rightarrow x$

$$= 3y \Rightarrow \frac{x}{y} = \frac{3}{1} = x : y = 3 : 1$$

Therefore, statement I alone gives the answer.

Statement II does not provide us with the answer.

Therefore, the correct answer is (a).

2. **Solution: (a) Statement I alone is sufficient to answer the question.**

Explanation:

I. The only multiple of 51 (i.e., 51 itself) is a two-digit number.

Therefore, statement I is sufficient.

II. $a + b = 6$

Statement II is insufficient.

Therefore, the correct answer is (a).

3. **Solution: (a) Statement II alone is sufficient to answer the question.**

Explanation:

Let the digits at the tens and the units place be x and y , respectively. Then,

I. $x + y = x - y$

$$y = -y$$

$$y = 0$$

But value of x is not known. Thus, statement I is insufficient.

II. The difference between the digits is 9. Thus, one digit can only be 9 and the other 0. Furthermore, only ten's digit can be 9. Therefore, the number is 90.

Thus, statement II alone is sufficient to answer the question and hence the correct answer is (a).

4. **Solution: (c) Both the statements are required to find the solution.**

Explanation:

Let the ten's digit be x and unit's digit be y . Thus, the number is $10x + y$

I. $(10x + y) - (10y + x) = 36$

$$\Leftrightarrow x - y = 4$$

Statement I alone is insufficient.

II. $x + y = 12$

Statement II alone is insufficient.

Both statements I and II are together necessary to answer the question as two equations are required to find the value of two variables x and y

Therefore, the correct answer is (c).

5. **Solution: (c) Both the statements are required to find the solution.**

Explanation:

I. $\frac{1}{2}(A - 3 + B - 3) = 18$

$$A + B = 42$$

Thus, statement I is insufficient.

II. $\frac{1}{3}(A + B + C) = 21$

$$A + B + C = 63$$

Thus, statement II is insufficient.

From I and II, we get $C = (63 - 42) = 21$

Thus, both the statements I and II are required to find the answer.

6. **Solution: (c) Both the statements I and II are required to give the answer.**

Solutions for
DATA
INTERPRETATION

1. LINE GRAPHS

1. **Solution:** (a) 210 and 320

Explanation:

According to the graph, the minimum production of the company is 210 tonnes and the maximum production of the company is 320 tonnes.

2. **Solution:** (c) 267

Explanation:

Average Production of the Company for All the Years

$$\begin{aligned} &= \frac{\text{Total Production by the Company for All the Years}}{\text{Number of Years}} \\ &= \frac{210 + 230 + 250 + 280 + 310 + 320}{6} \\ &= \frac{1600}{6} = 266.67 \text{ or } 267 \text{ tonnes (round off)} \end{aligned}$$

3. **Solution:** (d) None

Explanation:

In all the given years, production of the company has increased in the current year as compared with the production in the previous year. Therefore, in none of the years there has been a fall in production as compared with the previous year.

4. **Solution:** (c) 2010

Explanation:

Increase in production over the previous year's production = Production in a particular year - Production in the previous year
Percentage Increase in Production over the Production in Previous Year

$$\begin{aligned} &\text{Increase in Production over} \\ &= \frac{\text{Production in Previous Year}}{\text{Production in Previous Year}} \times 100 \end{aligned}$$

Method I:

$$\text{For 2008} = \frac{230 - 210}{210} \times 100 = 9.52\%$$

$$\text{For 2009} = \frac{250 - 230}{230} \times 100 = 8.69\%$$

$$\text{For 2010} = \frac{280 - 250}{250} \times 100 = 12.0\%$$

$$\text{For 2011} = \frac{310 - 280}{280} \times 100 = 10.71\%$$

$$\text{For 2012} = \frac{320 - 310}{310} \times 100 = 3.22\%$$

Therefore, in the year 2010, there was highest percentage increase in production over the production in the year 2009.

Method II:

The question can also be answered with minimum calculations. The aim is to find out the highest fraction which can be done as follows:

Step 1. Identify the highest increase in production over the production in the previous year (In the years 2010 and 2011, there is an increase of 30 tonnes in the production each year over the production in the previous year)

Step 2. Select the smallest denominator out of the two denominators in question, Therefore, select the smaller amount out of 2009 and 2010 production figures (which is 2009's production of 250 tonnes).

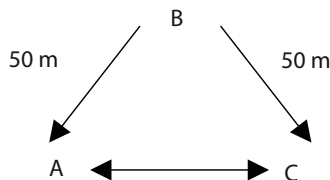
Solutions for
REASONING

1. DIRECTION SENSE

1. **Solution: (b) East**

Explanation:

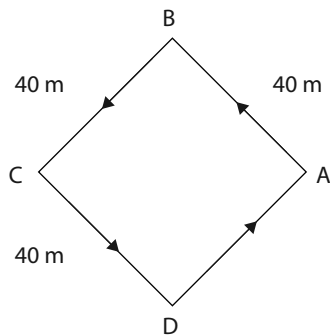
The positions of A, B and C are shown in the diagram given below. C is located to the east of A.



2. **Solution: (a) North-east**

Explanation:

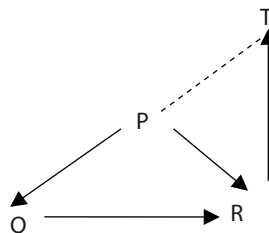
The movements of the person are shown in the figure given below (A to B, B to C, C to D and D to A). Finally, the person is moving from D to A in the north-east direction.



3. **Solution: (a) North**

Explanation:

T cannot be in the north of P. T can be in the east, north-east or south-east of P depending on how far is T from R.

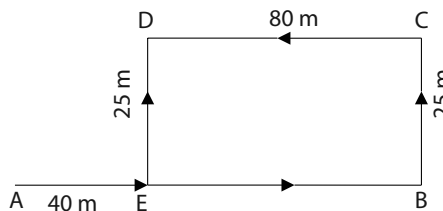


4. **Solution: (d) 45 m**

Explanation:

The movement of S is shown in the figure given below.

S's distance from the starting point A
 $= AB - EB$ ($EB = DC = 80$ m)
 $= 125$ m $- 80$ m $= 45$ m



5. **Solution: (b) 3 km in East**

Explanation:

The movement of the boy is shown in the figure given below (from O to A, A to B).

$\triangle OBA$ is right-angled at B.

According to Pythagoras theorem:

$$OA^2 = OB^2 + AB^2$$

$$OB^2 = OA^2 - AB^2$$

$$OB = \sqrt{(25 - 16)} \text{ km} = 3 \text{ km}$$

The boy is 3 km to the east of his initial position O.