

English Version
2nd Edition

TNPSC Expected Questions And
2020 - 2025 PYQ with video explanation

Beauty

MATHS

 **Concepts**

 **Shortcuts**

 **PYQ**

Subjective and Objective For
TNPSC GROUP – I,II,II(A),IV

3000+
Questions



உள்ளுவதெல்லாம் உயர்வுள்ளல்

TAF IAS ACADEMY

All Over Tamilnadu 87+ Branches / 18740+ Govt.Officers



M. Ranjith Prabu
Southern Railway

TNPSC

BEAUTY MATHS

APTITUDE (PART – I)

TNPSC GR-I, II, IIA, IV, SI, PC, SSC, RRB



TM 5286328



17 ஆண்டுகளில் 18740+ பேருக்கு அரகப்பணி / தமிழகம் முழுவதும் 87 கிளைகள்

TAF

IAS ACADEMY

Coaching for :

**UPSC - TNPSC - SSC
POLICE - SI - TET - TRB
BANKING - RAILWAY**

புத்தக தேவைக்கு (சூரியர் + தபால்) பெற...

செல் : 95669 74903

Head Office: **TENKASI**

9597587300 TAF IAS ACADEMY

tafiasacademyho@gmail.com

www.tafiasacademy.in

TAF IAS ACADEMY | TAF POLICE

த. ப. ஆதார மூர்த்தி M.Com., LL.B.,
கு.பா. TAF IAS ACADEMY

த. M. மாரியப்பன் B.A.,
பி.பா. TAF IAS ACADEMY

RIGHTS RESERVED BY AAMU PUBLICATION

**WITHOUT PRIOR PERMISSION OF AAMU PUBLICATION ANY PART OF
THIS BOOK CAN NOT BE REPRODUCED IN ANY OTHER FORMS.**

TOPIC : APTITUDE (PART - I)

AUTHOR : M. RANJITH PRABU, B.E, MBA.,

LANGUAGE : ENGLISH

PAGES : 552

PRICE : Rs.500/-

Thanks To All The Contributors of This Book..



தலைமையகம் : தென்காசி

8940077746



KURAL PATHIPPAGAM
Flat No. 156/21G, Ground Floor, Mangamal Salai,
Welcome Nagar, Tenkasi- 627811



TAFBOOKS_OFFICIAL



TAF BOOKS



பயன்கேஷி

மெய்யப்பொருள் காண்பது அறிவு

புத்தக மேலவகுதி :
தபாலில் பெறு
9566974903

<https://www.taCasareddy.in/shop/>

FOUNDER MESSAGE



J. Aagasa Moorthy M.Com., LL.B.,
FOUNDER, TAF IAS ACADEMY

“

Education is the most powerful
weapon which you can use to
change yourself and the world.

”



My Dear Students, 

It gives me immense happiness and pride to present “**Beauty Maths**” to all the competitive exam aspirants. Mathematics is not just a subject; it is the foundation of logical thinking, problem solving and success in every field.

This book is the result of the dedication, deep subject knowledge, and relentless hard work of our Author, **Mr. M.Ranjith Prabu B.E., MBA.**, whose passion for teaching and commitment to student success is truly inspiring.



A well-structured guide with **concise theory, shortcut methods, solved examples**, and practice exercises to make learning effective and exam-ready.



Comprehensive coverage of important topics with **exam-oriented** questions designed to build strong concepts and boost confidence.



Presented in a **simple and student-friendly manner**, making even complex ideas easy to understand and remember.



Our institution has always been committed to providing **high-quality educational resources** that empower students to achieve their goals. With this book, we aim to take one more step in our mission of delivering meaningful and accessible content for every aspirant.



Every page of this book is created to inspire students and aspirants to learn with confidence and determination. More than a guide for examinations, it is a companion that encourages disciplined preparation, smart learning, and continuous growth. May the knowledge shared through these pages help every learner move one step closer towards their dreams and bring greater pride to our institution through their success.

Remember, success is not a matter of luck; it is the result of consistent effort, smart work, discipline, and the right guidance. Believe in yourself, stay focused on your goals, and never stop learning.

Your hard work today will shape your bright tomorrow!

★ *All the Best for Your Bright Future!* ★



AUTHOR MESSAGE



Mr. M. RANJITH PRABU B.E., MBA.,

Southern Railway

“Mathematics is not about numbers, equations, computations, or algorithms: it is about understanding.”

“Mathematics becomes easy when practice becomes a habit.”



A student who understands mathematics does not simply solve problems – they learn how to face challenges with patience, precision, and confidence. In every competitive examination, mathematics plays the role of a silent weapon that rewards **preparation, consistency, and smart thinking**.



“Beauty Maths” is crafted to make mathematics simple, smart, and success-oriented for every competitive exam aspirant. This book helps **students to improve accuracy, and problem-solving skills** with confidence.



Therefore, keep the “Beauty Maths” book in your hands and achieve your dreams.



“Mathematics is not a bitter gallnut; it is a sweet sugarcane.”

Therefore, adore the **beauty of mathematics**; it will be sweet but never cloying. Conveying this truth is my primary duty as a teacher.



“Aamu's Beauty Maths” will serve as a great treasure for students. To easily succeed in competitive exams conducted by the Central and State governments, this book has been created with a vast collection of **model questions** and original **TNPSC question papers**, with **shortcut techniques, easy explanations, practice exercises**, explained in a very simple manner through **video compilations**.



With the clarity that **“planned hard work brings success more than mere hard work,”** Mr. Akash Sir Team wishes students to succeed in competitive exams and secure a position in government service...!!!

“The more you understand numbers, the more confidently you can shape your future.”



A perfect companion for achieving success in both Central and State Government examinations.

★ M. Ranjith Prabu

INDEX

S.NO.	TOPIC NAMES	PG. NO.
1.	NUMBERS	01 - 28
2.	SIMPLIFICATION	29 - 52
3.	LCM & HCF	53 - 87
4.	NUMBER SYSTEM	88 - 116
5.	AVERAGE	117 - 140
6.	RATIO & PROPORTION	141 - 172
7.	AGES	173 - 192
8.	PERCENTAGE	193 - 220
9.	PROFIT & LOSS	221 - 249
10.	SIMPLE INTEREST	250 - 280
11.	COMPOUND INTEREST	281 - 314
12.	TIME & WORK	315 - 360
13.	TIME & DISTANCE	361 - 380
14.	ALGEBRA	381 - 395
15.	MENSURATION	396 - 473
16.	PROBABILITY	474 - 501
17.	STATISTICS	502 - 516
18.	TNPSC – ORIGINAL QUESTIONS – 2025 & TNPSC EXPECTED QUESTIONS	517 - 542

PREVIOUS YEAR QUESTIONS - QR CODES

S.NO.	TOPIC NAMES	QR CODES
1.	NUMBERS	
	ROMAN LETTERS	
2.	SIMPLIFICATION	
3.	LCM & HCF (PART - 1 & 2)	
		
4.	NUMBER SYSTEM	
5.	RATIO & PROPORTION	
6.	PERCENTAGE	
7.	PROFIT & LOSS	

8.	SIMPLE INTEREST	
9.	COMPOUND INTEREST	
10.	TIME & WORK	
11.	MENSURATION	
12.	PROBABILITY	
13	TNPSC – ORIGINAL QUESTIONS - 2025	
14	TNPSC EXPECTED QUESTIONS	

SYLLABUS

TNPSC GROUP – I, II, IIA, IV SYLLABUS

UNIT I : APTITUDE / (15 QUESTIONS)

Simplification - Percentage - Highest Common Factor (HCF) - Lowest Common Multiple (LCM) - Ratio and Proportion - Simple interest - Compound interest - Area - Volume - Time and Work.



TNPSC EXAM



TOPIC WISE NUMBER OF QUESTIONS

2025

TOPICS	EXAMS					
	GROUP I 	GROUP II 	GROUP IV 	COMBINED ENGINEERING SERVICES (INTERVIEW POSTS) 	COMBINED ENGINEERING SERVICES (NON INTERVIEW POSTS) 	PUBLIC PROSECUTOR 
 TIME & WORK	3	2	1	3	3	2
 MENSURATION	2	3	1	2	2	2
 LCM & HCF	3	3	4	4	4	5
 PERCENTAGE	2	2	2	–	1	1
 NUMBER SYSTEM	–	1	1	1	–	–
 PROBLEMS ON AGES	2	–	–	–	–	–
 SIMPLE INTEREST	1	1	1	2	2	2
 COMPOUND INTEREST	1	1	1	2	2	2
 A.P & G.P	1	–	1	4	–	2
 SIMPLIFICATION	1	–	1	1	–	2
 AVERAGE	–	–	1	–	–	–
 RATIO & PROPORTION	3	2	3	1	1	2
 PROBABILITY	–	–	1	–	1	1
 PROFIT & LOSS	–	1	–	–	–	–
 REASONING	6	9	7	5	9	4
TOTAL	25	25	25	25	25	25



TYPES

NUMBERS



1

**Natural / Whole
/ Odd / Even /
Composite /
Prime Numbers**

2

**Divisibility
Rules**

3

**Finding
the
Unit Digit**

4

**Number of Zeros
/ Factors**

5

**Quotient /
Remainder /
Divisor /
Dividend**

6

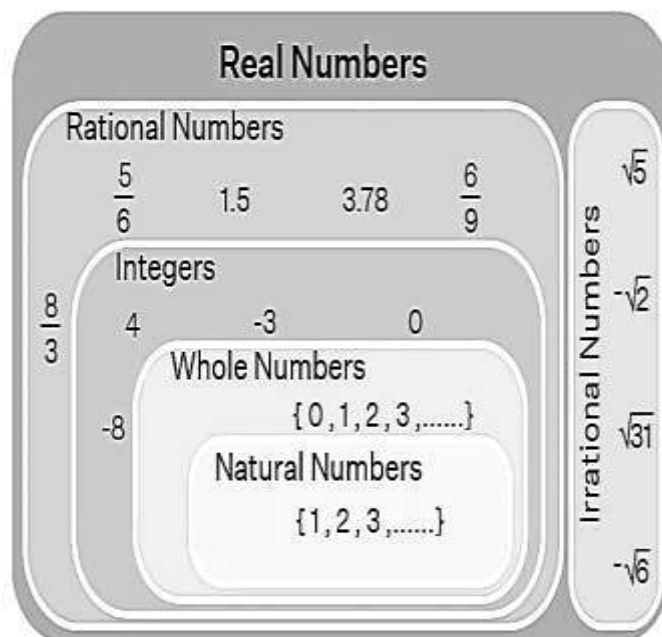
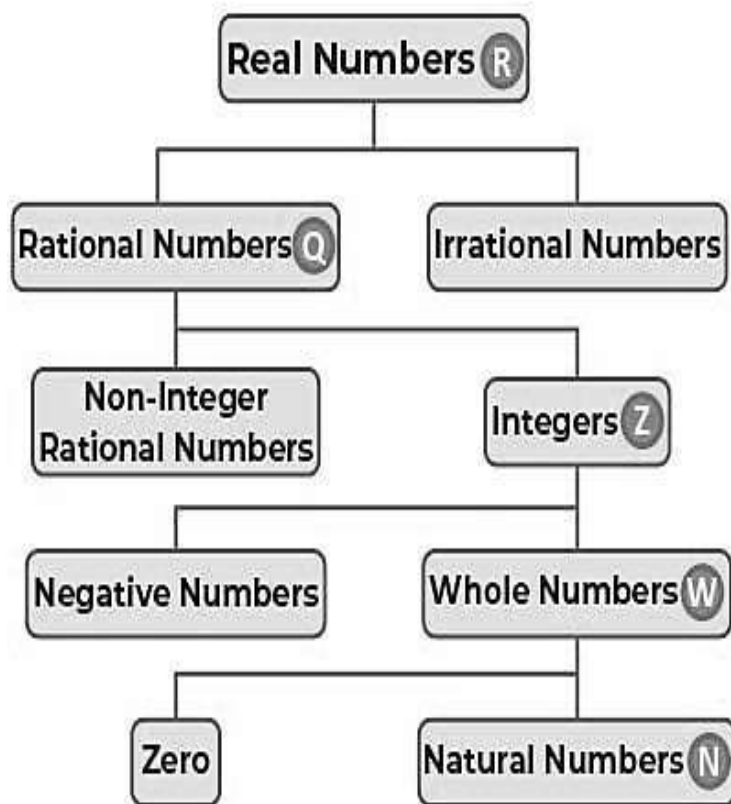
**Exam Marks /
Test Scores**

7

**Roman
Numerals**



Real Numbers Chart



Real Numbers: The set of all rational and irrational numbers.

Natural Numbers : Countable numbers are called Natural Numbers.

Eg: $(N) = \{1, 2, 3, 4, \dots\}$

Whole Numbers: Natural Numbers including zero are called Whole Numbers.

Eg: $(W) = \{0, 1, 2, 3, 4, \dots\}$

Integers: The collection of Natural Numbers, negative numbers, and zero.

Eg: $(Z) = \{\dots, -3, -2, -1, 0, 1, 2, 3, 4, \dots\}$

Rational Numbers: Numbers expressible as a fraction $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

Eg: $\frac{1}{2}, 0.75, 5$

Irrational Numbers: Numbers that cannot be expressed as simple fractions with non-repeating, non-terminating decimals.

Eg: $\pi, \sqrt{2}$

Odd Numbers: Numbers that are not divisible by 2.

Eg: 1, 3, 5, 7,

Even Numbers: Numbers that are divisible by 2.

Eg: 2, 4, 6, 8,

Complex Numbers: Numbers in the form $a + bi$, where a and b are real



Video Compilation of Numbers



TYPES



**VBODMAS /
VBIDMAS**

1

2

Fractions

**Splitting Partial
Fractions**

3

4

**Rational / Irrational
Numbers**

**Surds /Indices
(Powers)**

5

6

**Square Root /
Cube Root**

**Ladder method
(often used for Continued Fractions)**

7

* **RULE:- VBODMAS/VBIDMAS**

✓ V - Vinculum / Bar	————→	$\bar{n}$
✓ B - Bracket	————→	(), [], { }
✓ O - of (or) I	————→	Indices
✓ D	————→	Division
✓ M	————→	Multiplication
✓ A	————→	Addition
✓ S	————→	Subtraction

- * According to this method, the solution must first be found for what is in parentheses.
- * "Of" means multiplication, and **Order** (Exponents) means it must be solved second.
- * After this, you have to solve the calculations in the order of **Division, Multiplication, Addition, and Subtraction**.

LAYER RULES:

$$\begin{aligned}
 a^m \times a^n &= a^{m+n} \\
 \frac{a^m}{a^n} &= a^{m-n} \\
 (a^m)^n &= a^{m \times n} \\
 (ab)^n &= a^n b^n \\
 \left(\frac{a}{b}\right)^n &= \frac{a^n}{b^n} \\
 \frac{1}{a^m} &= a^{-m} \\
 a^0 &= 1
 \end{aligned}$$



**Mathematics is not about numbers,
equations, computations and Algorithms,
It is about UNDERSTANDING**

TAF IAS ACADEMY

முதிய பயிற்சி வகுப்புகள் ஆரம்பம் (விடுதி வசதி உண்டு)

**TNPSC
GROUP I, II**

**SI/POLICE
PHYSICAL..**

**TET/TRB/POLICE
BANK/RAILWAY**

**Regular Class & Test Batch Admission open.,
(Daily & Week End Batch Available)**



MODEL QUESTIONS

1. What is the LCM of the numbers 21, 25, 27, and 35.
 a) 105 b) 4725
 c) 7425 d) 501

Solution:-

$$\begin{array}{r|l} 3 & 21, 25, 27, 35 \\ \hline 5 & 7, 25, 9, 35 \\ \hline 7 & 7, 5, 9, 7 \\ \hline & 1, 5, 9, 1 \end{array}$$

$$\text{LCM} = 3 \times 5 \times 7 \times 5 \times 9 = 4725$$

2. Find the HCF of 1498 and 1284.
 a) 207 b) 211
 c) 214 d) 217

Solution:-

$$\begin{aligned} 1498 &= 2 \times 7 \times 107 \\ 1284 &= 2 \times 2 \times 3 \times 107 \\ &= 2^2 \times 3 \times 107 \\ \text{HCF} &= 2 \times 107 = 214 \end{aligned}$$

Shortcut:

Tips no:3

$$\begin{aligned} \text{Difference} &= 1298 - 1284 \\ &= 214 \end{aligned}$$

3. What is the GCD (Greatest Common Divisor) of the numbers 4, 6, 12, and 18?
 a) 2 b) 14
 c) 18 d) 16

Solution:-

$$\begin{array}{r|l} 2 & 4, 6, 12, 18 \\ \hline & 2, 3, 6, 9 \end{array}$$

$$\text{GCD} = 2$$

4. What is the HCF of the numbers $\frac{4}{9}, \frac{2}{5}, \frac{6}{8}, \frac{2}{5}$?
 a) $\frac{1}{160}$ b) $\frac{2}{481}$
 c) $\frac{1}{180}$ d) $\frac{1}{142}$

Solution:-

$$\text{HCF of fractions} = \frac{\text{HCF of Numerators}}{\text{LCM of Denominators}}$$

HCF of Numerators

$$\begin{array}{r|l} 2 & 4, 2, 6, 2 \\ \hline & 2, 1, 3, 1 \end{array}$$

LCM of Denominators

$$\begin{array}{r|l} 5 & 9, 5, 8, 5 \\ \hline 9 & 9, 1, 8, 1 \\ \hline 8 & 1, 1, 8, 1 \\ \hline & 1, 1, 1, 1 \end{array}$$

$$\text{HCF} = 2$$

$$\text{LCM} = 5 \times 9 \times 8 = 360$$

$$\text{HCF of fractions} = \frac{2}{360} = \frac{1}{180}$$

5. Find the LCM of $\frac{1}{3}, \frac{5}{6}, \frac{2}{9}, \frac{4}{27}$?
 a) 1/54 b) 10/27
 c) 20/3 d) 20/13

Solution:-

$$\text{LCM} = \frac{\text{LCM of Numerators}}{\text{HCF of Denominators}} = \frac{\text{LCM}(1, 5, 2, 4)}{\text{HCF}(3, 6, 9, 27)}$$

LCM of Numerators

$$\begin{array}{r|l} 2 & 1, 5, 2, 4 \\ \hline & 1, 5, 1, 2 \end{array}$$

HCF of Denominators

$$\begin{array}{r|l} 3 & 3, 6, 9, 27 \\ \hline & 1, 2, 3, 9 \end{array}$$

$$\text{LCM} = 2 \times 5 \times 2 = 20$$

$$\text{HCF} = 3$$

$$\text{LCM of fractions} = \frac{20}{3}$$

6. Write the following in ascending order $\frac{6}{7}, \frac{11}{14}, \frac{19}{28}, \frac{3}{4}$
 a) $\frac{19}{28} < \frac{3}{4} < \frac{11}{14} < \frac{6}{7}$
 b) $\frac{19}{28} < \frac{11}{14} < \frac{3}{4} < \frac{6}{7}$
 c) $\frac{11}{14} < \frac{3}{4} < \frac{6}{7} < \frac{19}{28}$
 d) $\frac{3}{4} < \frac{11}{14} < \frac{6}{7} < \frac{19}{28}$

Solution:-

Find the LCM (Least Common Multiple) for the denominators of all the fractions

2	7, 14, 28, 4
7	7, 7, 14, 2
2	1, 1, 2, 2
	1, 1, 1, 1

$$\text{LCM} = 2 \times 7 \times 2 = 28$$

All the fractions must be multiplied by the LCM

$$\frac{6}{7} \times 28 = 24 \quad \dots \dots \text{iv}$$

$$\frac{11}{14} \times 28 = 22 \quad \dots \dots \text{iii}$$

$$\frac{19}{28} \times 28 = 19 \quad \dots \dots \text{i}$$

$$\frac{3}{4} \times 28 = 21 \quad \dots \dots \text{ii}$$

Ascending Order :

$$\frac{19}{28} < \frac{3}{4} < \frac{11}{14} < \frac{6}{7}$$

7. Find the HCF of 1.08, 0.36, and 0.9.

- a) 18 b) 0.18
c) 36 d) 0.36

Solution:-

Since there are two digits after the decimal point, the decimal numbers must be multiplied by 100 to convert them into whole numbers.

$1.08 \times 100 = 108$	2	108, 36, 90
$0.36 \times 100 = 36$	3	54, 18, 45
$0.9 \times 100 = 90$	3	18, 6, 15
		6, 2, 5

$$\text{HCF} = 2 \times 3 \times 3 = 18$$

The GCD of 18 must be divided by 100 again.

$$\frac{18}{100} = 0.18$$

8. Find the LCM of 3, 2.7, and 0.09.

- a) 27 b) 2700
c) 900 d) 90

Solution:-

The decimal numbers must be multiplied by 100 to convert them into whole numbers

$$3 \times 100 = 300$$

$$2.7 \times 100 = 270$$

$$0.09 \times 100 = 9$$

3	300, 270, 9
2	100, 90, 3
3	50, 45, 3
5	50, 15, 1
	10, 3, 1

$$3 \times 2 \times 3 \times 5 \times 10 \times 3 = 2700$$

The LCM of 2700 must be divided by 100

$$\therefore \text{LCM} = \frac{2700}{100} = 27$$

9. Find the HCF of $2^3 \times 3^2 \times 5 \times 7^4$, $2^2 \times 3^5 \times 5^2 \times 7^6$ and $2^3 \times 5^3 \times 7^2$.

- a) 880 b) 980
c) 780 d) 1080

Solution:-

✍ To find the GCD, one must take the common factors of the given numbers.

✍ Take the lowest powers (exponents) of the numbers 2, 5, and 7.

Among 2^3 , 2^2 , 2^3 , the lowest power is 2^2 .

Among 5^1 , 5^2 , 5^3 , the lowest power is 5^1 .

Among 7^4 , 7^6 , 7^2 , the lowest power is 7^2 .

✍ The numbers with the lowest powers must be multiplied.

$$2^2 \times 5 \times 7^2$$

$$\text{HCF} = 2 \times 2 \times 5 \times 7 \times 7 = 980$$

10. Find the HCF $2^2 \times 3^3 \times 5^3$, $2^3 \times 3^2 \times 5^2 \times 7$ and

$$2^4 \times 3^4 \times 5 \times 7 \times 11.$$

- a) $2^2 \times 3^2 \times 5$ b) $2^2 \times 3^2 \times 5 \times 7 \times 11$
c) $2^4 \times 3^4 \times 5^5$ d) $2^4 \times 3^4 \times 5^5 \times 7 \times 11$

PRACTICE QUESTIONS

TYPE - 1

- Find the 17th term of an A.P. 4, 9, 14...
a) 85 b) 83
c) 80 d) 84
- If the first term of an A.P is 6 and the common difference is 5, find its general term?
a) $-5n + 1$ b) $6n + 1$
c) $5n - 1$ d) $6n - 1$
- $1 + 6 + 11 + 16 + \dots + x = 148$
Find the value of x .
a) 41 b) 31
c) 36 d) 27
- If the sum of the first n terms of a series is $3n^2 + 2n$,
Find the 16th term.
a) 123 b) 736
c) 645 d) 95
- Which term of the arithmetic sequence
 $24, 23\frac{1}{4}, 22\frac{1}{2}, \dots$ is 3?
a) 27 b) 29 c) 28 d) 30
- The 11th term from the end of AP 10, 7, 4,, - 62
is.
a) -46 b) -28
c) -34 d) -32
- If t_n is the n^{th} term of an A.P, then what is the value
of $t_{n+1} - t_{n-1}$?
a) 2d b) 4d
c) 0 d) 2
- If $k+1, 3k$ and $4k+2$ be any three consecutive
terms of an A.P. Then the value of k is?
a) 0 b) 1 c) 2 d) 3
- How many terms are there in the following
A. P - 1, $-5/6, -2/3, \dots 10/3$.
a) 25 b) 27
c) 29 d) 21



- The 10th and 18th term of an AP are 41 and 73
respectively, then find the 27th term.
a) 109 b) 103
c) 105 d) 111
- Determine the general term of an AP whose
7th term is -1 and 16th term is 17.
a) $(3n + 8)$ b) $(4n - 7)$
c) $(15 - 2n)$ d) $(2n - 15)$

TYPE - 2

- If a, b, c, l, m are in AP then the value of
 $a - 4b + 6c - 4l + m$ is?
a) 1 b) 2
c) 3 d) 0
- a, b, c are in A.P. then If $\frac{a-b}{(a-c)} = is ?$
a) $\frac{a}{b}$ b) $\frac{b}{c}$
c) $\frac{a}{c}$ d) 1
- If the n^{th} term of an AP is $t_n = 3 - 5n$ then the
sum of the first n terms is?
a) $\frac{n}{2}[1 - 5n]$ b) $n(1 - 5n)$
c) $\frac{n}{2}(1 + 5n)$ d) $\frac{n}{2}(1 + n)$
- The sum of three consecutive terms of an A.P is 6
and their product is -120. Find its common
difference?
a) 8 b) 6
c) -4 d) 2
- If 9 times the 9th term and 15 times the 15th term
is equal then the value of 6 times the 24th term is?
a) 1 b) 18
c) 24 d) 0
- The ratio of the 6th and 8th term of an A.P is 7:9.
Then find the ratio of 9th and 13th term?
a) $\frac{7}{5}$ b) $\frac{5}{7}$
c) $\frac{9}{3}$ d) $\frac{13}{9}$

18. Let us say a, b, c are in AP then which of the following is true?

- a) $c - a = 2b$ b) $\frac{a+c}{2} = b$
 c) $\frac{ac}{2} = b$ d) $\sqrt{ac} = b$

19. In an AP p^{th} term is Q and q^{th} term is P . Then the common difference is?

- a) -1 b) $\frac{Q-P}{p-q}$
 c) $\frac{P-Q}{p-q}$ d) 1

20. If the 9^{th} term of an AP is zero. Then the 29^{th} term of an AP is?

- a) $2t_{19}$ b) $2t_{15}$
 c) $2t_{12}$ d) $2t_{10}$

TYPE - 3

21. if the n^{th} term of a sequence is $100n + 10$ then the sequence is ?

- a) An A.P b) A G.P
 c) A Constant sequence d) Neither A.P nor G.P

22. if $a_1, a_2, a_3, \dots$ is an A.P then $a_5, a_{10}, a_{15}, \dots$ is?

- a) An A.P
 b) A G.P
 c) A Constant sequence
 d) Neither A.P nor G.P

23. a, b, c, l, m, n are an A.P then $3a + 7, 3b + 7, 3c + 7, 3l + 7, 3m + 7, 3n + 7$ is?

- a) An A.P b) A G.P
 c) A Constant sequence d) Neither A.P nor G.P

24. a, b, c are an A.P then $\frac{1}{bc}, \frac{1}{ca}, \frac{1}{ab}$ is ?

- a) An A.P b) A G.P
 c) A Constant sequence d) Neither A.P nor G.P

25. a, b, c are an A.P then $3^a, 3^b, 3^c$ is?

- a) An A.P
 b) A G.P
 c) A Constant sequence
 d) Neither A.P nor G.P

TYPE - 4

26. Find the sum of the first 30 terms of an A.P. whose n^{th} term is $3 + 2n$.

- a) 1650 b) 1020
 c) 1740 d) 1800

27. Find the sum of all three digit natural numbers which are divisible by 9.

- a) 55350 b) 56450
 c) 54450 d) 50350

28. In an A.P. sum of four consecutive terms is 28 and their sum of their squares is 276. Find the smallest number.

- a) 2 b) 5
 c) 7 d) 1

29. The sum of the first n terms of an A.P is $\frac{5n^2}{2} + \frac{3n}{2}$, then find the 17th term.

- a) 65 b) 84
 c) 73 d) 96

30. The third term of an A.P. is 7 and the seventh term exceeds three times the 3^{rd} term by 2. Find the sum of first 20 terms.

- a) 418 b) 360
 c) 740 d) 290

31. Find the sum of all natural numbers between 100 and 200 which are not divisible by 5.

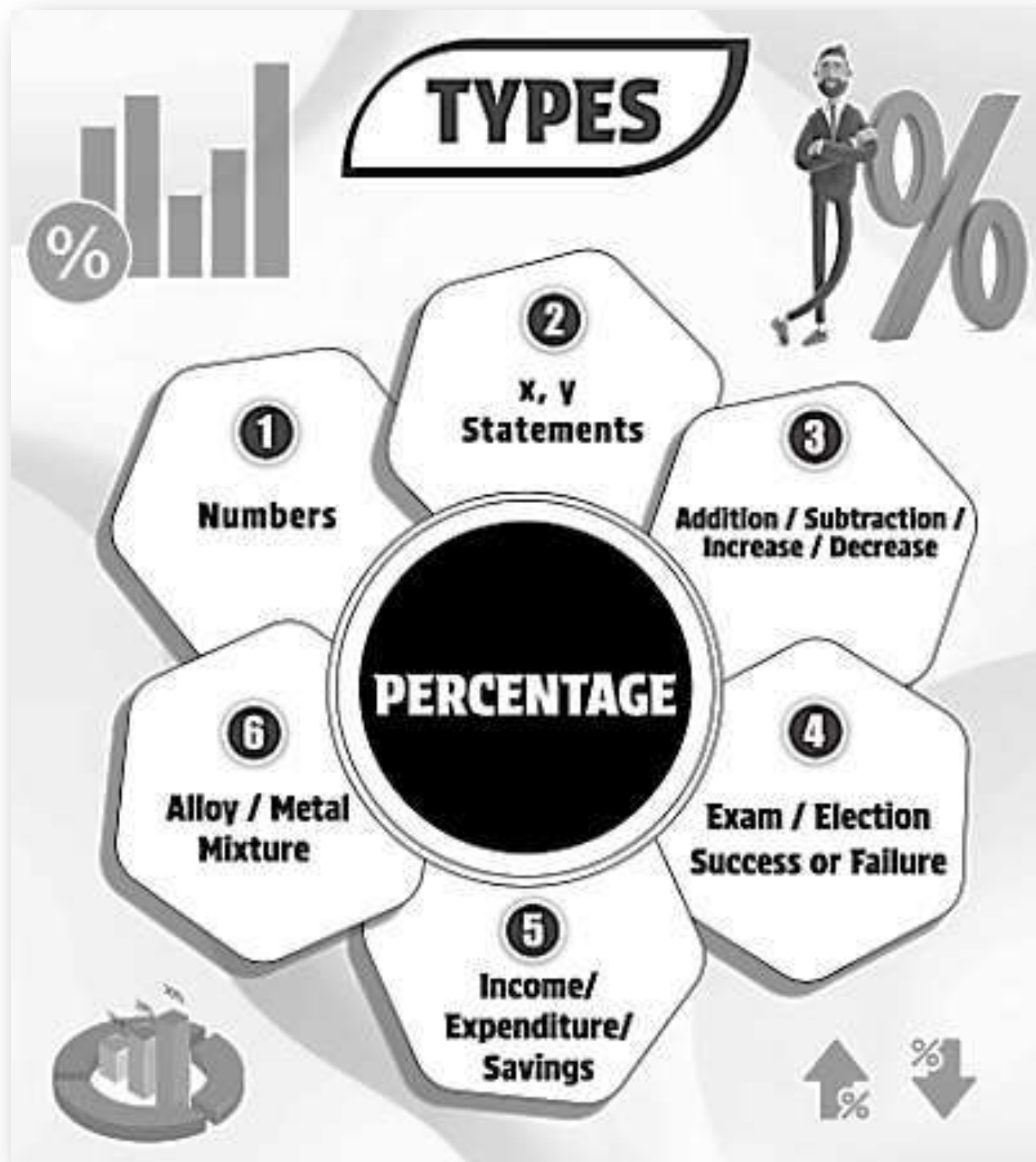
- a) 12000 b) 12100
 c) 11800 d) 1300

32. Find the sum of the all the three-digit numbers, which leave the remainder 2 when divided by 3.

- a) 1,099 b) 1, 64,850
 c) 1, 68,540 d) 3, 29,700

33. Find the sum of all odd integers less than 450?

- a) 50625
 b) 60625
 c) 62550
 d) 70565



✍ Percentage indicates how much out of 100. Percentage is the process of comparing a value to its total value and expressing it as a fraction of one hundred. (For example)

5% should be written as $\frac{5}{100}$.

✍ If a number x increases (or decreases) by $y\%$, then

✍ New number obtained is $= \frac{100 \pm y}{100} \times x$

✍ If x is $a\%$ more than y , then y is $\frac{a}{100+a} \times 100\%$ less than x .

✍ If x is $a\%$ less than y , then y is $\frac{a}{100-a} \times 100\%$ more than x .

PERCENTAGE TO FRACTION CONVERSION:

$$50\% = \frac{1}{2},$$

$$20\% = \frac{1}{5},$$

$$12.5\% = \frac{1}{8}$$

$$33\frac{1}{3}\% = \frac{1}{3},$$

$$16\frac{2}{3}\% = \frac{1}{6},$$

$$11\frac{1}{9}\% = \frac{1}{9}$$

$$25\% = \frac{1}{4},$$

$$14\frac{2}{7}\% = \frac{1}{7},$$

$$10\% = \frac{1}{10}$$

If a number is first increased by $a\%$ and then decreased by $a\%$, the resulting value will definitely be less

than that number. This can be written as $\left(\frac{a^2}{100}\right)\%$ **or** $\left(\frac{a}{10}\right)^2\%$

✍ A number is first increased or decreased by $a\%$. Then if the value obtained is increased or decreased by $b\%$, the resulting value

$$= \pm a \pm b + \frac{(\pm a)(\pm b)}{100}\%$$

(Here, + should be used for an increase and – for a decrease)

MEDEL QUESTIONS

1. Find the Simple Interest on a principal of ₹10,000 at an interest rate of 10% per annum for 2 years.

- a) 5000 b) 1000
c) 2000 d) 4000

Solution:-

$$P = ₹10,000, \quad r = 10\%, \quad n = 2 \text{ years}$$

$$SI = \frac{Pnr}{100} \\ = \frac{10000 \times 10 \times 2}{100} = 2000$$

$$\text{Simple Interest} = ₹2,000$$

Short cut:

100	10000
2×10	x

$$x = 100 \times 20 = \mathbf{2000}$$

2. Find the Simple Interest on ₹40,000 at an interest rate of 15% per annum for $4\frac{1}{2}$ years.

- a) ₹27,500 b) ₹27,000
c) ₹30,000 d) ₹25,000

Solution:-

$$P = ₹40000, \quad r = 15\%, \quad n = 4\frac{1}{2} \text{ years}$$

$$SI = \frac{Pnr}{100} \\ = \frac{40000 \times \frac{9}{2} \times 15}{100} = \frac{40000 \times 9 \times 15}{100 \times 2} = ₹27000$$

3. Find the simple interest on a principal of ₹5,000 for 2 years at an interest rate of 8% per annum.

- a) ₹1,000 b) ₹2,050
c) ₹2,500 d) ₹1,750

Solution:-

$$P = ₹5000, \quad r = 8\%, \quad n = 2\frac{1}{2} \text{ years} = \frac{5}{2} \text{ years}$$

$$SI = \frac{Pnr}{100} = \frac{5000 \times \frac{5}{2} \times 8}{100} \\ = \frac{5000 \times 5 \times 8}{100 \times 2}$$

$$S.I = ₹1000$$

4. Find the simple interest on ₹12,000 at an interest rate of 8% per annum for 10 months.

- a) ₹500 b) ₹800
c) ₹600 d) ₹700

Solution:-

$$P = ₹12000, \quad r = 8\%,$$

$$n = 10 \text{ months} = \frac{10}{12} \text{ years} = \frac{5}{6} \text{ years}$$

$$SI = \frac{Pnr}{100} = \frac{12000 \times \frac{5}{6} \times 8}{100} \\ = \frac{12000 \times 5 \times 8}{100 \times 6} = ₹800$$

5. Find the simple interest on ₹50,000 at an interest rate of 10% per annum for 73 days.

- a) ₹4,000 b) ₹3,500
c) ₹1,000 d) ₹2,000

Solution:-

$$P = ₹50000, \quad r = 10\%, \quad n = \frac{73}{365} = \frac{1}{5} \text{ years}$$

$$SI = \frac{Pnr}{100} = \frac{50000 \times \frac{1}{5} \times 10}{100} \\ = \frac{50000 \times 1 \times 10}{100 \times 5} = ₹1000$$

To convert **73 days** into a year, you must divide it by **365**. (While doing this, you should keep the **multiples of 73** in mind. For example: 73, 146, 219, 292, 365).

6. A borrowed ₹10,000 from B on March 9, 2026. If A repaid the loan on May 21, 2026, with an interest rate of 7.5% per annum, what is the simple interest paid by him?

- a) ₹250 b) ₹275
c) ₹150 d) ₹100



Solution:-

March = 31 - 9 = 22 days

April = 30 days

May = 21 days

= 73 days

$$= \frac{73}{365} = \frac{1}{5} \text{ year}$$

$$P = ₹10000, \quad n = \frac{1}{5} \text{ year}, \quad r = 7\frac{1}{2} = \frac{15}{2} \%,$$

$$SI = \frac{Pnr}{100} = \frac{10000 \times \frac{15}{2} \times \frac{1}{5}}{100}$$

$$= \frac{10000 \times 15 \times 1}{100 \times 5 \times 2} \Rightarrow S.I = ₹150$$

7. A borrowed ₹4,000 on June 7, 2025, and repaid it on August 19, 2025. If the interest rate is 5% per annum, what is the total amount paid by him?

- a) ₹4,040 b) ₹3,050
c) ₹1,500 d) ₹2,000

Solution:-

$$P = ₹4000, \quad r = 5\%,$$

$$SI = \frac{Pnr}{100}$$

Time (N) = Days

June: 23 days (30 - 7)

July: 31 days

August: 19 days

Total: 73 days

$$\text{Conversion: } \frac{73}{365} = \frac{1}{5} \text{ year}$$

$$S.I. = \frac{4000 \times \frac{1}{5} \times 5}{100} = ₹40$$

$$\text{Total Amount} = \text{Principal} + \text{Simple Interest}$$

$$= 4000 + 40 = ₹4040$$

8. Find the total Amount if the Principal is ₹1,750 for a period of 2 years at an interest rate of 10% per annum.

- a) ₹350 b) ₹2,000
c) ₹2,100 d) ₹3,500

Solution:-

$$S.I = \frac{P \times n \times r}{100}$$

Alternative Method:

$$= \frac{1750 \times 10 \times 2}{100}$$

$$S.I = ₹350$$

$$A = P + S.I$$

$$(A) = 1750 + 350$$

$$= ₹2100$$

$$A = P \left(1 + \frac{rn}{100} \right)$$

$$= 1750 \left(1 + \frac{2 \times 10}{100} \right)$$

$$= 1750 \left(1 + \frac{20}{100} \right)$$

$$= 1750 \times \frac{120}{100}$$

$$= ₹2100$$

9. What is the total amount obtained from a principal of ₹15,000 at an annual interest rate of 10% over 3 years?

- a) ₹20,000 b) ₹20,500
c) ₹19,500 d) ₹19,000

Solution:-

$$SI = \frac{Pnr}{100}$$

$$SI = \frac{15000 \times 3 \times 10}{100} = 4500$$

$$A = P + S.I = 15000 + 4500 = ₹19500$$

10. Kamal invests ₹3,000 at an interest rate of 7% per annum. Find the total amount he receives at the end of one year.

- a) ₹3,210 b) ₹4,210
c) ₹5,210 d) ₹3,420

Solution:-

$$P = ₹3000, \quad n = 1, \quad r = 7\%$$

$$SI = \frac{Pnr}{100} = \frac{3000 \times 1 \times 7}{100} = 210$$

$$A = P + S.I \Rightarrow 3000 + 210$$

$$A = ₹3210$$





TYPES



A, B and A, B, C

1

2

Efficiency & Wages

Joining and Leaving

3

4

Alternate Days

Variation Problems

5

6

$$M_1 H_1 D_1 = M_2 H_2 D_2$$
$$M_1 D_1 / W_1 = M_2 D_2 / W_2$$

OR & AND
Problems

7

8

Pipe Problems

OR, AND

38. 10 men can complete a piece of work in 15 days and 15 women can complete the same work in 12 days. If all the 10 men and 15 women work together, in how many days the work get completed?

- a) 6
b) $6\frac{1}{3}$
c) $6\frac{2}{3}$
d) $7\frac{2}{3}$

39. 6 women or 8 men can construct a room in 86 days. Then the number of days taken for 7 women and 5 men to do the same type of room is

- a) 46 days **b) 48 days**
c) 50 days d) 52 days

40. 2 men and 3 boys can do a piece of work in 10 days while 3 men and 2 boys can do the same work in 8 days. In how many days can 2 men and 1 boy do the work?

- a) $12\frac{1}{2}$ days
b) 12 days
c) $13\frac{1}{2}$ days
d) $13\frac{1}{2}$ days

PIPES & CISTERN

41. Two taps A and B can fill a cistern in 18 minutes and 24 minutes respectively. If both taps are opened together, when the tap B must be turned off so that the cistern is filled in 12 minutes?

- a) 2 minutes
b) 4 minutes
c) 6 minutes
d) 8 minutes

PRACTICE QUESTIONS – SOLUTIONS

TIME AND WORK

TYPE - 1

1. **Solution**

$$A's\ 1\ day\ work = \frac{1}{20}$$

$$B's\ 1\ day\ work = \frac{1}{30}$$

$$(A + B)'s\ 1\ day\ work = \frac{1}{20} + \frac{1}{30}$$

$$= \frac{3 + 2}{60} = \frac{5}{60} = \frac{1}{12}$$

∴ (A + B) together can finish the work in 12 days.

2. **Solution**

A → 3 days, B → 6 days

$$A + B = \frac{1}{3} + \frac{1}{6} = \frac{2 + 1}{6} = \frac{1}{2}$$

A and B together can finish the work in 2 days.

3. **Solution**

$$A\ and\ B\ work\ together = \frac{AB}{A + B}$$

$$= \frac{8 \times 16}{24} = 5\frac{1}{3}$$

4. **Solution**

$$Man\ \&\ Women\ work\ together = \frac{AB}{A + B}$$

$$= \frac{4 \times 12}{16}$$

So, together they can finish the work = 3 days.

5. Solution

$$A's \text{ work } 7\frac{1}{2} = \frac{15}{2} \text{ hours}$$

$$B's \text{ work } 4\frac{1}{5} = \frac{21}{5} \text{ hours}$$

$$A \text{ and } B \text{ together} = \frac{AB}{A+B}$$

$$= \frac{\frac{15}{2} \times \frac{21}{5}}{\frac{15}{2} + \frac{21}{5}} = \frac{\frac{63}{2}}{\frac{117}{10}}$$

$$= \frac{63}{2} \times \frac{10}{117} = \frac{35}{13} \text{ hours}$$

6. Solution

$$\begin{aligned} \text{The second workers alone} &= \frac{AB \times A}{AB - B} \\ &= \frac{10 \times 15}{5} \\ &= 30 \end{aligned}$$

So, the second workers alone can finish the work in 30 days.

7. Solution

$$\begin{aligned} B's \text{ work} &= \frac{AB \times A}{(AB) - A} \\ &= \frac{6 \times 12}{12 - 6} = 12 \text{ days} \end{aligned}$$

8. Solution

$$\begin{aligned} 'B' \text{ alone} &= \frac{AB \times A}{AB - A} \\ &= \frac{12 \times 8}{12 - 8} \\ &= \frac{96}{4} \end{aligned}$$

B can finish the work = 24 days

9. Solution

A and B together finish the work in 4 days.

B's work = 12 days

$$\begin{aligned} A's \text{ work} &= \frac{AB \times B}{B - AB} = \frac{4 \times 12}{12 - 4} = \frac{48}{8} \\ &= 6 \text{ days} \end{aligned}$$

10. Solution

A → 24 days, A + B → 6 days

$$\begin{aligned} B \text{ works alone} &= \frac{AB \times A}{AB - A} \\ &= \frac{24 \times 6}{18} \end{aligned}$$

B = 8 days

11. Solution

$$\begin{aligned} B \text{ works alone} &= \frac{AB \times A}{A - AB} \\ &= \frac{16 \times 48}{48 - 16} \\ &= \frac{16 \times 48}{32} \\ &= 24 \end{aligned}$$

So, B alone can finish the work in 24 days.

12. Solution

A → 15 minutes, B → 18 minutes,

$$\begin{aligned} AB &= \frac{15 \times 18}{15 + 18} \\ &= \frac{15 \times 18}{33} = \frac{90}{11} \end{aligned}$$

To complete 22 chairs the time taken is:

$$\frac{90}{11} \times 22 = 180 \text{ minutes}$$

TYPE - 2

13. Solution

Ratio of days = A : B = 10 : 15 = 2 : 3

$$\text{Day} \propto \frac{1}{\text{Wager}}$$

∴ Wages ratio = 3 : 2

$$\text{Amount distribution} = \frac{\text{individual part}}{\text{total part}} \times \text{total amount}$$

$$A's \text{ wages} = \frac{3}{5} \times 15000 = 9000$$

n	2	3	4	5	- 4
If, $x + \left(\frac{1}{x}\right) = n$	$x + \left(\frac{1}{x}\right) = 2$	$x + \left(\frac{1}{x}\right) = 3$	$x + \left(\frac{1}{x}\right) = 4$	$x + \left(\frac{1}{x}\right) = 5$	$x + \left(\frac{1}{x}\right) = -4$
Then, $x^2 + \left(\frac{1}{x}\right)^2 = n^2 - 2$	2	7	14	23	14
Then, $x^3 + \left(\frac{1}{x}\right)^3 = n^3 - 3n$	2	18	52	110	- 52
Then, $x^4 + \left(\frac{1}{x}\right)^4 = (n^2 - 2)^2 - 2$	2	47	194	527	194
Then, $x^5 + \left(\frac{1}{x}\right)^5 = (n^2 - 2) \times (n^3 - 3n) - n$	2	123	724	2525	- 724
Then, $x^6 + \left(\frac{1}{x}\right)^6 = (n^3 - 3n)^2 - 2$	2	322	2702	12098	2702
Then, $x^7 + \left(\frac{1}{x}\right)^7 = (n^3 - 3n) \times [(n^2 - 2)^2 - 2] - n$	2	843	10084	57965	- 10084
$x - \frac{1}{x} = \sqrt{(n^2 - 4)}$	0	$\sqrt{5}$	$\sqrt{12}$	$\sqrt{21}$	$\sqrt{12}$

n	2	3	4	5	- 4
If, $x - \left(\frac{1}{x}\right) = n$	$x - \left(\frac{1}{x}\right) = 2$	$x - \left(\frac{1}{x}\right) = 3$	$x - \left(\frac{1}{x}\right) = 4$	$x - \left(\frac{1}{x}\right) = 5$	$x - \left(\frac{1}{x}\right) = -4$
Then, $x^2 + \left(\frac{1}{x}\right)^2 = n^2 + 2$	6	11	18	27	18
Then, $x^3 - \left(\frac{1}{x}\right)^3 = n^3 + 3n$	14	36	76	140	- 76
Then, $x^4 + \left(\frac{1}{x}\right)^4 = (n^2 + 2)^2 - 2$	34	119	322	727	322
Then, $x^5 - \left(\frac{1}{x}\right)^5 = (n^2 + 2) \times (n^3 + 3n) - n$	82	393	1364	3775	- 1364
Then, $x^6 + \left(\frac{1}{x}\right)^6 = (n^3 + 3n)^2 + 2$	198	1298	5778	19602	5778
Then, $x^7 - \left(\frac{1}{x}\right)^7 = (n^3 + 3n) \times [(n^2 + 2)^2 - 2] - n$	474	4281	24468	101775	- 24468
$x + \frac{1}{x} = \sqrt{(n^2 + 4)}$	$\sqrt{8}$	$\sqrt{13}$	$\sqrt{20}$	$\sqrt{29}$	$\sqrt{20}$

Algebraic formulas:

★ $(a + b)^2 = a^2 + 2ab + b^2$

★ $(a - b)^2 = a^2 - 2ab + b^2$

★ $a^2 - b^2 = (a + b)(a - b)$

★ $(a + b)^2 + (a - b)^2 = 2(a^2 + b^2)$

★ $(a + b)^2 - (a - b)^2 = 4ab$

★ $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

★ $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

★ $(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ac)$

★ $(a^3 + b^3 + c^3 - 3abc) = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$

★ $a^3 + b^3 + c^3 = 3abc$, if $(a + b + c = 0)$

MODEL QUESTIONS

1. If the equations $kx + 2y = 5$; $3x + y = 1$ have no solution, what is the value of k ?

- a) $k = 3$ b) $k = 6$
c) $k \neq 6$ d) $k = 4$

Solution:

There is no solution to the set of equations. If,

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

$$a_1x + b_1y = c_1$$

The form of Equation

$$\text{Here, } a_1 = k, b_1 = 2, a_2 = 3, b_2 = 1$$

$$\frac{k}{3} = \frac{2}{1} \Rightarrow k = 2 \times 3 = 6$$

Then the value of k is 6.

If $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ Then there is only one solution

possessed (unified)

If $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ then there is infinitely many

solutions (consistent)

If $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ then there is no solution.

(Non-uniform)

$$ax^2 + bx + c = 0, a \neq 0$$

Quadratic equation,

$$\text{Sum of roots } \alpha + \beta = \frac{-b}{a}$$

$$= \frac{\text{Coefficient of } x}{\text{Coefficient of } x^2}$$

Multiplication of roots

$$\alpha\beta = \frac{c}{a} = \frac{\text{Constant element, } a}{\text{Coefficient of } x^2}$$

Roots with α, β quadratic equation

$$x^2 + (\alpha + \beta)x + \alpha\beta = 0$$

2. If $x + \frac{1}{x} = 8$, then $x^2 + \frac{1}{x^2} = ?$

- a) 62 b) 66 c) 64 d) 72

Solution:

$$\begin{aligned} x + \frac{1}{x} &= a, \text{ then } x^2 + \frac{1}{x^2} \\ &= a^2 - 2 \\ &= 64 - 2 = 62 \end{aligned}$$

3. If $x - \frac{1}{x} = 2\sqrt{2}$ then What is $x^2 + \frac{1}{x^2}$?

- a) 12 b) 10 c) 16 d) 11

Solution:

$$\begin{aligned} x - \frac{1}{x} &= 2\sqrt{2} \\ x^2 + \frac{1}{x^2} &= a^2 + 2 \\ &= (2\sqrt{2})^2 + 2 = 8 + 2 = 10 \end{aligned}$$

4. If $a^2 - 4a + 1 = 0$, then $a^2 + \frac{1}{a^2} = ?$

- a) 14 b) 16 c) 18 d) 12

Solution:

$$a^2 - 4a + 1 = 0$$

Divide by a .

$$a - 4 + \frac{1}{a} = 0$$

$$a + \frac{1}{a} = 4$$

$$a^2 + \frac{1}{a^2} = a^2 - 2 = 4^2 - 2 = 14$$



5. If $x - \frac{2}{x} = 15$ then $x^2 + \frac{4}{x^2} = ?$

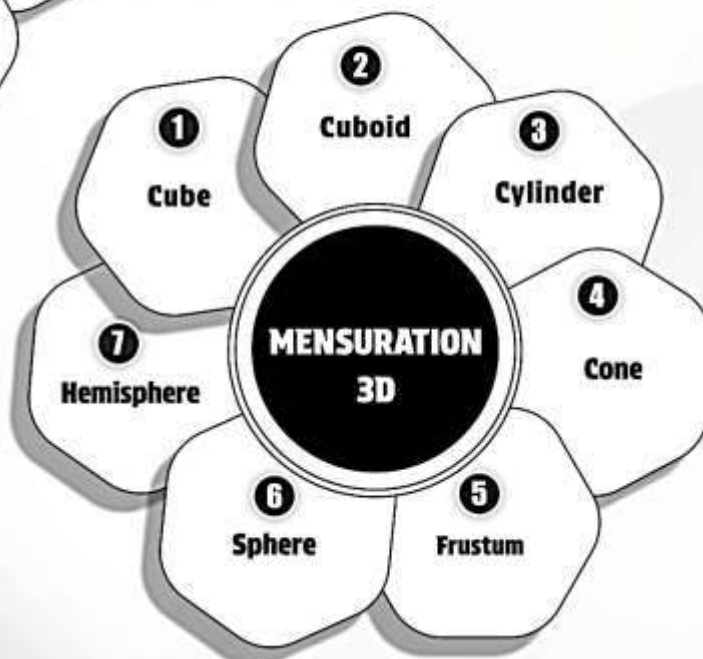
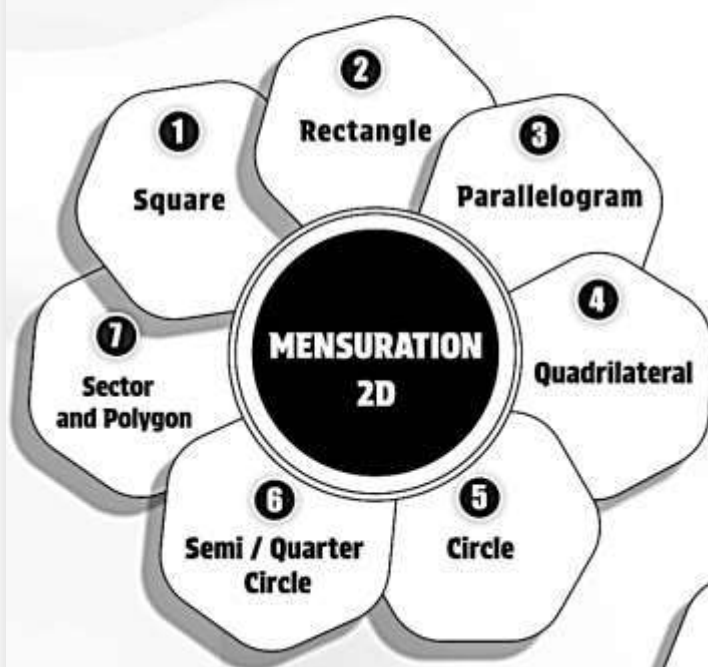
- a) 114 b) 160 c) 229 d) 412

Solution:

$$\begin{aligned} \left(x - \frac{2}{x}\right)^2 &= 15^2 \\ x^2 + \frac{4}{x^2} - 2 \times x \times \frac{2}{x} &= 225 \\ x^2 + \frac{4}{x^2} &= 229 \end{aligned}$$



TYPES

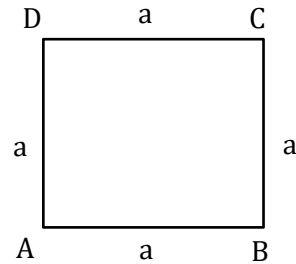


MENSURATION FORMULAS**1. Square**

Area of the square = a^2 sq. units

Perimeter of the square = $4a$

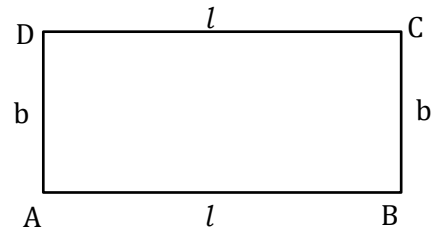
Length of the diagonal = $a\sqrt{2}$

**2. Rectangle**

Area of the rectangle = $l \times b$ sq. units

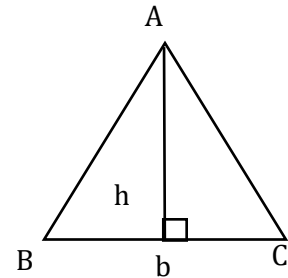
Perimeter of the rectangle = $2 \times (l + b)$

Diagonal of the rectangle $d = \sqrt{l^2 + b^2}$

**3. Triangle**

Area of the triangle = $\frac{1}{2} \times b \times h$ sq. units

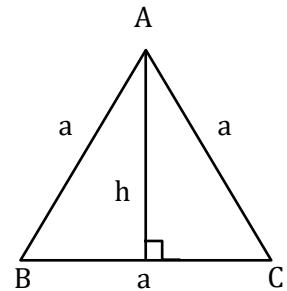
Perimeter of the triangle = $AB + BC + CA$

**4. Equilateral triangle**

Area of the equilateral triangle = $\frac{\sqrt{3}}{4} a^2$ sq. units

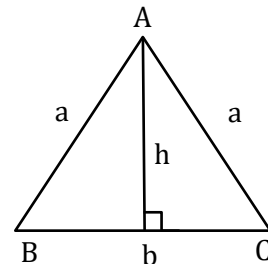
Perimeter of the equilateral triangle = $AB + BC + CA = 3a$

Perpendicular height of the equilateral triangle $h = \frac{\sqrt{3}}{2} a$

**5. Isosceles triangle**

Area of the isosceles triangle = $h\sqrt{a^2 - h^2}$

Perimeter of the isosceles triangle = $2a + 2\sqrt{a^2 - h^2}$



MODEL PROBLEMS

SQUARE

1. If the perimeter of a square is 28 meters, what is its area?

- a) 42 b) 36
c) 16 d) 49

Solution:-

Perimeter of a square = $4a$

$$4a = 28 \text{ meters}$$

$$a = \frac{28}{4} = 7 \text{ meters}$$

Side of the square = 7 meters

$$\begin{aligned} \text{Area of the square} &= a^2 \\ &= 7^2 \\ &= \mathbf{49 \text{ m}^2} \end{aligned}$$

2. The area of a square is 81 cm^2 . If the sides of the square area increased by 2, then what will be the area of the new square?

- a) 87 b) 83
c) 121 d) 100

Solution:-

Given Area = 81

$$a^2 = 81$$

$$a = \sqrt{81} = \sqrt{9 \times 9} = 9$$

New side = Original side + 2 cm

$$= 9 + 2 = 11 \text{ cm}$$

New area:

$$a^2 = 11^2 = \mathbf{121 \text{ cm}^2}$$

3. The area of a square is 16 square units. How many units is the diagonal of the square?

- a) $4\sqrt{2}$
b) 4
c) $16\sqrt{2}$
d) 8

Solution:-

Area of the square = 16 sq. units

$$a^2 = 16$$

$$a = \sqrt{16} = \sqrt{4 \times 4} = 4$$

Side of the square = 4

$$\text{Diagonal of the square} = a\sqrt{2} = 4\sqrt{2}$$

4. If each side of a square is increased by 50%, then what is the percentage change in its area?

- a) 100% b) 25%
c) 125% d) 60%

Solution:-

Assume the side of a square is 100 units.

$$= 100 \times \frac{150}{100} \times \frac{150}{100} = 225$$

$$= 225 - 100 = 125\%$$

5. The ratio of the area of two squares is 16 : 1. Find the ratio between their perimeters.

- a) 3 : 1 b) 4 : 1
c) 5 : 1 d) 6 : 1

Solution:-

Let the areas of the two square be $16x$ and x .

Its sides are $4x$ and $1x$.

The ratio of the perimeters = $4a$

$$= 4 \times 4x : 4 \times 1x$$

$$= 16x : 4x$$

$$= 16 : 4 = 4 : 1$$

Short cut:

To change the ratio of Area to the ratio of Perimeter, take the square root.

$$\sqrt{16} : \sqrt{1} = 4 : 1$$



TYPES



Median and Mode

1

2

**Range and Coefficient
of Range**

Standard Deviation

3

4

Variance

**Coefficient of
Variation**

5

6

**Fibonacci and
Lucas Series**



- ★ We use various statistical measures to analyse the core essence of all collected data through tables, diagrams, and graphs.

Types of Averages

- ★ Various types of averages are used to measure the central tendency. Among them, the most important ones are:

✍ Arithmetic Mean

✍ Median

✍ Geometric Mean

✍ Mode

✍ Harmonic Mean

Arithmetic Mean

- ★ The simple Arithmetic Mean value is obtained by adding all the values of the given data and dividing the sum by the total number of observations.

Geometric Mean (G.M.)

- ★ The Geometric Mean of a data set containing 'n' elements is the n^{th} root of the product of those 'n' elements. If $X_1, X_2, X_3, \dots, X_n$ is a data set containing 'n' elements, then:

$$\text{Geometric Mean (G. M.)} = \sqrt[n]{X^1 \cdot X^2 \cdot X^3 \dots X_n}$$

Harmonic Mean (H.M.)

- ★ The Harmonic Mean is the reciprocal of the arithmetic mean of the given data.

$$\text{Arithmetic Mean} > \text{Geometric Mean} > \text{Harmonic Mean}$$

Median

- ★ The Median is the middle value of a data set that has been arranged in either ascending or descending order.

Mode

- ★ The Mode is the value that appears most frequently in a specific data set.
- ★ If no value is repeated in a data set, then that data has no mode.

Relationship between Mode, Median, and Arithmetic Mean

$$\text{Mode} = (3 \times \text{Median}) - (2 \times \text{Arithmetic Mean})$$



TNPSC – ORIGINAL QUESTION PAPERS – 2025

PUBLIC PROSECUTOR

- Find the HCF of $18x^3 - 24x^2 + 42x - 36$, $3x^3 - 9x^2 + 30x - 24$
A) $-3(x - 1)$ B) $-3(x + 1)$
C) $3(x + 1)$ D) $3(x - 1)$
- If $1 + 2 + 3 + \dots + n = 406$, then find n :
A) -28 B) 29
C) 28 D) -29
- If which number is denoted by SUN?
A) 55086 B) 5585
C) 5586 D) 5568
- When a dice is rolled, find the probability to get the number, which is greater than 4?
A) $\frac{1}{3}$ B) $\frac{1}{2}$
C) $\frac{2}{3}$ D) $\frac{1}{6}$
- A, B and C can do a piece of work in 5, 6 and 12 days respectively. If A, B and C work together to complete, then find their separate shares if they will paid Rs.27,000 for completing the work.
A) 10000, 5000, 12000
B) 5000, 12000, 10000
C) 10000, 12000, 5000
D) 12000, 10000, 5000
- If the radius of the cone is doubled, then new volume will be ____ times the original volume. (3D)
A) 5 B) 3 C) 2 D) 4
- Find the Difference between C.I. and S.I. for $P = \text{Rs.}12,000$, $r = 8\%$, $n = 3$ years.
A) Rs.235.544 B) Rs.236.544
C) Rs.237.544 D) Rs.238.544
- In what time will Rs.17,800 amount to Rs.19,936 at 6% simple interest per annum?
A) 4 years B) 3 years
C) $2\frac{1}{2}$ years D) 2 years
- Selvan has Rs.900 and wants to divide it between Manimozhi and Bharathi in the ratio 3:2, then How much amount Bharathi can get?
A) 540 B) 360
C) 340 D) 560

- Find the LCM of 12, 14, 19, 25 and 36
A) 1197 B) 1197000
C) 11970 D) 119700
- Simplify:
$$\frac{2t^2 + 7t + 6}{2t^2 + 9t + 9} \div \frac{t^2 + 5t + 6}{3t^2 + 18t + 27}$$

A) 3 B) 1
C) 2 D) 4
- Simplify $(72)^5 \div (12)^5 \times (3)^5$
A) 18^5 B) 5^{18}
C) 6^5 D) 3^5
- Find out the missing one
SCD, TEF, UGH, ____, WKL.
A) XIJ B) VIJ
C) CMN D) UJI
- The population of a town is increasing at the rate of 5% p.a. It was 1200 in the year 2020. Find the population in the year 2023 approximately.
A) 1389 B) 1379
C) 1399 D) 1369
- Find the missing number for the following series:
 $\frac{1}{125}, \frac{1}{25}, _, 1, 5, 25$
A) $\frac{1}{7}$ B) $\frac{2}{5}$
C) $\frac{1}{5}$ D) $\frac{2}{7}$
- Find the missing term:
2A11, 4D13, 12G17, ?
A) 48I22 B) 48J23
C) 36K21 D) 48L20
- Which word does NOT belong with others?
A) Index B) Glossary
C) Chapter D) Book
- Babu can weave a saree in 24 days. Ramesh is twice as good a weaver as Babu. If both of them weave together, then in how many days can they complete weaving the saree?
A) 10
B) 12
C) 8
D) 24



19. If an aluminium sphere of radius 24 cm is melted to make a cylinder of radius 6 cm, then the height of the cylinder is

- A) 512 cm B) 128 cm
C) 256 cm D) 64 cm

20. Find the compound interest for the given data.

Principal = Rs.8000, $r = 4\%$ p.a., $n = 1\frac{1}{2}$ years, interest compounded annually.

- A) Rs.486.40 B) Rs.468.40
C) Rs.466.40 D) Rs.484.40

21. Find the simple interest of the principal Rs.35,500 at 10% per annum for $3\frac{1}{2}$ years.

- A) Rs.12,400
B) Rs.12,425
C) Rs.12,450
D) Rs.12,500

22. The number of correct answer given by Ramesh and Suresh in a quiz competition are in the ratio 8:9. If they had scored a total of 85 points in the competition, the how many points did Suresh get?

- A) 35 B) 40
C) 45 D) 50

23. Find the LCM of

$$x^2 - 2x - 3, x^2 + 3x + 2 \text{ and } x^2 - 1$$

- A) $(x - 1)(x + 3)(x + 2)(x + 1)$
B) $(x - 1)(x + 1)(x + 2)(x - 3)$
C) $(x - 1)(x + 1)(x + 2)(x - 2)$
D) $(x - 1)(x - 2)(x + 3)(x - 3)$

24. What is the smallest 5 digit number that is exactly divisible by 144 and 216?

- A) 10268 B) 10368
C) 10468 D) 10168

25. Find GCD of each pair $6(x^2 - 3x), (2x + 10)$

whose LCM is $6x^3 + 12x^2 - 90x$.

- A) 1
B) 2
C) 3
D) 4

**COMBINED CIVIL SERVICES
EXAMINATION - I IN GROUP - I AND IA
SERVICES DOA**

26. One man 3 women and 4 boys can do a piece of work in 96 hours, 2 men and 8 boys can do it in 80 hours, 2 men and 3 women can do it in 120 hours then 5 men and 12 boys can do it in.

- A) $39\frac{1}{11}$ hours B) $42\frac{7}{11}$ hours
C) $43\frac{7}{11}$ hours D) 44 hours

27. 'The diagonal of a rectangle is thrice its smaller side. The ratio of the length to the breadth of the rectangle is :

- A) 3:1 B) $\sqrt{3}:1$
C) $\sqrt{2}:1$ D) $2\sqrt{2}:1$

28. If $x:7.5 = 8:y = 7:17.5$ find $x:y$

- A) 3:22 B) 1:7
C) 3:20 D) 3:23

29. If Rs.1,600 is divided between two people P and Q in the ratio 2:3, what is Q's share?

- A) 900 B) 600
C) 1000 D) 1200

30. L.C.M. of $(2x^2 - 3xy)^2, (4x - 6y)^3$ and $(8x^3 - 27y^3)$ is _____?

- A) $2x(2x - 3y)^3(4x^2 + 6xy + 9y^2)$
B) $2^3x^2(2x - 3y)^3(4x^2 + 6xy + 9y^2)$
C) $2^2x^2(2x - 3y)^2(4x^2 + 6xy + 9y^2)$
D) $2^2x^2(2x - 3y)^2(4x + 6xy + 9y)$

31. Peter got 30% of the maximum marks in an examination and failed by 10 marks. However, Paul who took the same examination got 40% of the total marks and got 15 marks more than the passing marks. What were the passing marks in the examination?

- A) 35 B) 65
C) 85 D) 70

32. Akila scored 80% of marks in an examination. If her score was 576 marks then find the maximum marks of the examination.

- A) 720
B) 620
C) 820
D) 710