DAY 1 — 1. A SQUARE AND A CUBE

M7G6L5

- **Key Terms :** Factor, Prime Number, Square Number, Perfect Square, Square Root, Prime Factorisation, Perfect Cube, Cube Root, Triangular Number
- **Concept Explaination-Know the term :**
  Instructions: Introduce each term using definitions and examples. Connect each concept to a real-life example to build readiness.

Key Term	Definition	Example
Factor	A number that divides another number exactly, leaving no remainder.	Factors of 12: 1, 2, 3, 4, 6, 12
Prime Number	A number greater than 1 that has exactly two factors: 1 and itself.	2, 3, 5, 7, 11,.. are prime numbers.
Square Number	A number obtained by multiplying any number by itself. Written as n^2.	$-5 \times -5 = (-5)^2 = 25$; $3 \times 3 = 3^2 = 9$ $2.5 \times 2.5 = (2.5)^2 = 6.25$
Perfect Square	The square of a natural number. It has an odd number of factors.	1, 4, 9, 16, 25, 36 ... are perfect squares.
Square Root ($\sqrt{\ }$)	The inverse process of squaring. $x^2 = y$, then $\sqrt{y} = x$. x is an integer	$\sqrt{49} = 7$, because $7 \times 7 = 49$
Prime Factorisation	Writing a number as a product of its prime factors only.	$36 = 2 \times 2 \times 3 \times 3$; factors pair up → perfect square!
Perfect Cube	A number obtained by multiplying a number by itself three times (n^3).	$8 = 2^3$; $27 = 3^3$; $64 = 4^3$
Cube Root ($\sqrt[3]{\ }$)	The inverse process of cubing. If $x^3 = y$, then x is the cube root of y $\sqrt[3]{y} = x$	$\sqrt[3]{27} = 3$, because $3 \times 3 \times 3 = 27$
Triangular Number	The number of points that can be formed as a triangle: sume of any two consecutive triangular numbers is a perfect square.	Ex:1, 3, 6, 10, 15, ... $1+3=4=2^2$; $3+6=9=3^2$; $6+10=16=4^2$

Note : All perfect squares are square numbers. But not all square numbers are perfect squares.

- **Real-Life Connection:**

Side of a square tile whose area is $81 cm^2 = \sqrt{81} = 9$ cm.

Edge of a cube-shaped gift box whose volume is $125\ cm^3 = \sqrt[3]{125} = 5$ cm.

Squares and cubes help architects, designers, and engineers every day!

Student corner-Reading and Practice

Instructions: Read all key terms carefully. Attempt all questions independently. Check your understanding using examples.

A. Fill in the blanks.

1. The square root of 144 is _____, because _____× _____= 144.
2. A perfect square always has_____ number of factors, and it never ends with the digits 3, 7, _____ or _____.
3. $\sqrt[3]{512}$ = _____, and 5^3 = _____. A number is a perfect cube if its prime factors can be split into identical groups.

B. MCQs - Tick (✓) the correct answer.

1. Which of the following numbers is definitely NOT a perfect square?
   (i) 196 (ii) 238 (iii) 441 (iv) 625
2. The prime factorisation of 216 is $2^3 \times 3^3$. What is $\sqrt[3]{216}$?
   (i) 4 (ii) 6 (iii) 8 (iv) 12

C. Match the following.

	Column A		Column B
1.	$\sqrt{64}$	( )	(a) 125
2.	5^3	( )	(b) 8
3.	Factors of 9	( )	(c) 10
4.	1 + 3 + 5 + 7	( )	(d) 1, 3, 9 (odd number of factors)
5.	$\sqrt[3]{1000}$	( )	(e) $16 = 4^2$ (sum of first 4 odd numbers)

DAY 2 — 2. POWER PLAY

- **Key Terms :** Exponential Form, Base, Scientific Notation, Negative Exponent, Exponent, Power, Exponential Growth, Zero Exponent, Prime Factorisation
- **Concept Explaination-Know the term :**

  Instructions: Introduce each term using definitions and examples. Connect each concept to a real-life example to build readiness.

Key Term	Definition	Example
Exponential Form	The symboilc form of representation the repeated multiplication	e.g. $5 \times 5 \times 5 = 5^3$
Base	The number that is repeatedly multiplied.	e.g. In 3^4, the base is 3.
Scientific Notation	Writing a number as $x \times 10^y$, where $1 \leq x < 10$.	e.g. $5900 = 5.9 \times 10^3$
Negative Exponent	$n^{-a} = 1/n^a$; it means the reciprocal of its power.	e.g. $2^{-3} = \frac{1}{2^3} = \frac{1}{8}$
Exponent (Power)	The number of times a base is multiplied by itself.	e.g. In 2^5, the exponent is 5
Exponential Growth	Growth where a quantity multip -lies (doubles, triples) in each step.	e.g. Paper thickness doubles each fold.
Zero Exponent	For any non-zero number its power raised to 0 equals to 1.	e.g. $7^0 = 1$; $100^0 = 1$
Prime Factorisation	Expressing a number as a product of its prime factors.	e.g. $12 = 2^2 \times 3$

Student corner-Reading and Practice

Instructions: Read the key terms carefully. Then attempt all questions on your own.

A. Fill in the blanks :

1. In 4^3, the base is _____ and the exponent is _____.
2. 5^0 = _____ and 3^{-2} = _____.
3. The scientific notation of 45,000 is _____.

B. MCQs - Tick (✓) the correct answer.

4. The value of $2^3 \times 2^2$ is:

   (a) 2^6 (b) 2^5 (c) 4^6 (d) 2^{10}

5. Which of these is in scientific notation?

   (a) 54×10^3 (b) 0.9×10^5 (c) 3.7×10^2 (d) 12×10^4

C. Match the following :

1.

Column A		Column B
i. $2 \times 2 \times 2 \times 2$	( )	a. 65,000
ii. 10^{-2}	( )	b. 1 $(n \neq 0)$
iii. 6.5×10^4	( )	c. $2^4 = 16$
iv. n^0	( )	d. 0.01

2.

Column A		Column B
i. $n^a \times n^b =$	( )	a. n^{a-b}
ii. $(n^a)^b =$	( )	b. n^{ab}
iii. $n^a \div n^b =$	( )	c. n^{a+b}

DAY 3 — 3. A STORY OF NUMBERS

- **Key Terms :** Number System, Tally Marks, Landmark Numbers, Place Value System, One-to-One Mapping, Base-n Number System, Zero (0)
- **Concept Explaination-Know the term :**

  Instructions: Introduce each term using definitions and examples. Connect each concept to a real-life example to build readiness.

Term	Definition	Example
Number System	A standard sequence of symbols or names used to represent and count quantities.	e.g. Hindu, Roman, Egyptian are number systems.
Tally Marks	Notches or marks made for each object counted; one of the oldest counting methods.	e.g. |||| = 4 objects counted.
Landmark Numbers	Special reference numbers in a system that help to represent and organise other numbers.	e.g. In Roman numberals : I=1,V=5, X=10, L=50, C=100, M=1000.
Place Value System	A positional system where the position of a digit deter mines which landmark number it represents.	e.g. In 375: 3 is in hundreds place, 7 in tens, 5 in ones.
One-to-One Mapping	Pairing each object in a collection with exactly one symbol or name, and vice versa.	e.g. Each cow paired with one stick to count a herd.
Base-n Number System	A system where each landmark number is n times the previous one; landmark numbers are powers of n.	e.g. Base-10: 1, 10, 100, 1000 - each 10× the last.

Student corner-Reading and Practice

Instructions: Read the key terms carefully. Then attempt all questions on your own.

A. Fill in the blanks :

1. The place value of 6 in 6,712 is _____, while its face value is _____.
2. In the Roman system, the numeral M stands for the number _____.
3. A number system where the position of a digit tells us its value is called a _____ system.

B. MCQs - Tick (✓) the correct answer.

4. What is the Hindu-Arabic equivalent of the Roman numeral CMXLIX?

   (a) 969 (b) 1149 (c) 949 (d) 1169

5. What makes the Hindu number system fully unambiguous?

   (a) Base 60 system (b) Use of tally marks

   (c) Using 0 as a digit (d) Roman symbols

C. Match the following :

	Column A		Column B
1.	CDXLIV	( )	a. 1900
2.	MCM	( )	b. 444
3.	DCLXVI	( )	c. 2026
4.	MMXXVI	( )	d. 990
5.	CMXC	( )	e. 666

DAY 4 — 4. QUADRILATERALS

- **Key Terms :** Quadrilateral, Bisect, Perpendicular Lines, Transversal, Diagonal, Parallel Lines, Congruent Triangles, Angle Sum Property
- **Concept Explaination-Know the term :**

  Instructions: Introduce each term using definitions and examples. Connect each concept to a real-life example to build readiness.

Term	Definition	Example
Quadrilateral	A simple closed figure formed with exactly 4 line segments.	e.g. Square, rectangle, rhombus, trapezium.
Bisect	To divide a line segment/ angle into two equal parts.	e.g. Diagonals of a rectangle bisect each other.
Perpendicular Lines	Lines that meet at exactly 90°.	e.g. Diagonals of a square are perpendicular.
Transversal	A line that intersects two or more lines at distinct points.	e.g. A side of a paralle logram acts as a transversal to its parallel sides.
Diagonal	A line segment joining two non-adjacent (opposite) vertices of a quadrilateral.	e.g. In rectangle ABCD, AC and BD are diagonals.
Parallel Lines	Lines that never meet; they are always the same distance apart.	e.g. Opposite sides of a rectangle are parallel.
Congruent Triangles	Triangles that are identical in shape and size; all corresponding sides and angles are equal.	e.g. $\Delta ABC \cong \Delta PQR$ means AB = PQ, BC = QR AC = PR
Angle Sum Property	The sum of all interior angles in any quadrilateral is 360°.	e.g. Quadrilateral ABCD, $\angle A + \angle B + \angle C + \angle D = 360°$.

Student corner-Reading and Practice

Instructions: Read the key terms carefully. Then attempt all questions on your own.

A. Fill in the blanks :

1. The sum of all angles in any quadrilateral is _____.
2. A quadrilateral with all sides equal and all angles 90° is called a _____.
3. The diagonals of a rectangle are _____ in length and they _____ each other.

B. MCQs - Tick (✓) the correct answer.

4. In a parallelogram, the adjacent angles:
   (a) are equal (b) sum in 90°
   (c) sum in 180° (d) sum in 360°
5. The diagonals of a square bisect each other at:
   (a) 45° (b) 60° (c) 90° (d) 120°

C. Match the following :

	Column A		Column B
1.	Rectangle	( )	(a) All sides are equal; diagonals bisect at 90°
2.	Rhombus	( )	(b) At least one pair of parallel opposite sides are opposite
3.	Parallelogram	( )	(c) Opposite sides are parallel; diagonals bisect each other
4.	Trapezium	( )	(d) All angles are 90°; diagonals equal and bisect each other

DAY 5 — 5. NUMBER PLAY

- **Key Terms :** Consecutive Numbers, Multiple, Factor, Even Number, Odd Number, Parity, Remainder, Divisibility Rule, Digital Root
- **Concept Explaination-Know the term :**

  Instructions: Introduce each term using definitions and examples. Connect each concept to a real-life example to build readiness.

Key Term	Definition	Example
Consecutive Numbers	Numbers that follow each other in order, differing by 1.	3, 4, 5, 6 are consecutive numbers.
Multiple	A number obtained by multiplying a given number by any whole number.	Multiples of 4: 4, 8, 12, 16 ...
Factor	A number that divides another number exactly (no remainder).	Factors of 12: 1, 2, 3, 4, 6, 12.
Even Number	A number exactly divisible by 2. Leaves remainder 0 when divided by 2.	2, 6, 14, 48 are even numbers.
Odd Number	A number that is NOT exactly divisible by 2. When divided by 2 leaves remainder 1.	3, 7, 15, 31 are odd numbers.
Parity	The property of two number being with equal property.	14 and 28 have the same parity (both even).
Remainder	What is left over after dividing a number as evenly as possible.	17 ÷ 5 = 3, remainder 2.

Divisibility Rule	A shortcut to check if a number divides another without actually dividing.	Sum of digits divisible by 9 → number is divisible by 9.
Digital Root	Add all digits of a number repeatedly until a single digit remains.	489710 → 4+8+9+7+1+0=29 → 2+9=11 → 1+1=2

Student corner-Reading and Practice

Instructions: Read the key terms carefully. Then attempt all questions on your own.

A. Fill in the blanks :

1. The sum of any two _____ numbers is always even.
2. A number is divisible by 9 if the _____ of its digits is divisible by 9.
3. The digital root of 729 is _____.

B. MCQs - Tick (✓) the correct answer.

1. Which of the following is always even when added?
   (a) odd + odd (b) odd + even
   (c) even + even (d) Both (a) and (c)
2. What is the digital root of 5832?
   (a) 8 (b) 9 (c) 6 (d) 3

C. Match the following :

Column A		Column B
1. Parity of 14 and 28	( )	a. A shortcut - sum of digits ÷ 3
2. Digital Root of 36	( )	b. Leaves remainder 2 when divided by 5
3. Divisibility rule for 3	( )	c. Both even - same parity
4. 7 expressed as 5k + 2 (k = 1)	( )	d. Single digit = 9

DAY 6 — 6. WE DISTRIBUTE, YET THINGS MULTIPLY

- **Key Terms :** Algebraic Expression, Variable (Letter-number), Distributive Property, Identity, Terms of an Expression, Coefficient, Like Terms, Expansion, Square of a Binomial, Difference of Squares
- **Concept Explaination-Know the term :**

  Instructions: Introduce each term using definitions and examples. Connect each concept to a real-life example to build readiness.

Key Term	Definition	Example
Algebraic Expression	A combination of numbers and letter-symbols (variables) by operations.	3a + 2b - 5 is an algebraic expression.
Variable (Letter-number)	A letter that stands for any number; its value can change.	In 4x + 7, the variable is x.
Distributive Property	Multiplying a number by a sum equals multiplying each addend separately then adding. $a(b + c) = ab + ac$.	$3(4+5) = 12+15 = 27$.
Identity	A mathematical statement that is true for ALL values of the variables. $(a+b)^2 = a^2 + 2ab + b^2$ is always true	$(2+3)^2 = 2^2+2.2.3+3^2 = 25$
Terms of an Expression	The individual parts of an expression separated by + or - signs.	In $4a^2 - 3ab + b$, terms are $4a^2$, $-3ab$, and b.
Coefficient	The number multiplied by a variable in a term.	In 5ab the coefficient is 5.

Like Terms	Terms that have exactly the same variables (and powers); only their coefficients differ.	$3x^2$ and $7x^2$ are like terms.
Expansion	Removing brackets by applying the distributive property to get a sum of terms.	$(x+2)(x+3)$ expands to x^2+5x+6.
Square of a Binomial	Squaring a two-term expression; key identities: $(a+b)^2 = a^2+2ab+b^2$ and $(a-b)^2 = a^2-2ab+b^2$.	$(3+4)^2 = 9+24+16 = 49$. $(3-4)^2 = 9 - 24+16 = 1$.
Difference of Squares	The identity $(a+b)(a-b) = a^2-b^2$, useful for fast multiplication.	$102\times98 = (100+2)(100-2) = 10000-4 = 9996$.

Student corner-Reading and Practice

Instructions: Read the key terms carefully. Then attempt all questions on your own.

A. Fill in the blanks :

1. The distributive property states: $a \times (b + c) =$ _____ + _____.
2. In the identity $(a + b)^2 = a^2 + 2ab + b^2$, the middle term $2ab$ is called the _____ term.

B. MCQs - Tick (✓) the correct answer.

3. Which identity helps calculate 98×102 quickly?
   (a) $(a + b)^2 = a^2 + 2ab + b^2$ (b) $(a - b)^2 = a^2 - 2ab + b^2$
   (c) $(a + b)(a - b) = a^2 - b^2$ (d) $a(b + c) = ab + ac$

C. Match the following :

Column A		Column B
1. $(a + b)(a - b)$	( )	a. $a^2 - 2ab + b^2$
2. $(a + b)^2$	( )	b. $ab + mb + an + mn$
3. $(a - b)^2$	( )	c. $a^2 - b^2$
4. $(a + m)(b + n)$	( )	d. $a^2 + 2ab + b^2$

DAY 7 — 7. PROPORTIONAL REASONING-1

- **Key Terms :** Ratio, Terms of Ratio, Simplest Form, HCF, Proportion, Factor of Change, Cross Multiplication, Dividing in a Ratio, Proportional Quantities
- **Concept Explaination-Know the term :**

  Instructions: Introduce each term using definitions and examples. Connect each concept to a real-life example to build readiness.

Term	Definition	Example
Ratio	A comparison of two quantities using division, written as a : b. For every 'a' units of the first quantity, there are 'b' units of the second.	Ex: Width 60 mm, Height 40 mm → Ratio = 60 : 40
Terms of Ratio	The two numbers in a ratio a : b are called its terms. 'a' is the first term and 'b' is the second term.	Ex: In 3 : 5, the terms are 3 and 5.
Simplest Form	Highest Common Factor - the largest number that divides both terms of the ratio exactly. Used to simplify ratios.	Ex: HCF of 72 and 96 is 24.
HCF	A ratio reduced by dividing both terms by their HCF until no common factor remains (other than 1).	Ex: 60 : 40 → HCF=20 → Simplest = 3 : 2
Proportion	Two ratios are in proportion if they have the same simplest form. Written as a : b :: c : d.	Ex: 60:40 :: 30:20, since both = 3:2
Cross Multiplication	If a:b :: c:d, then ad = bc. Used to verify proportion and find unknown terms in a ratio.	Ex: 3:4 :: 6:8 → 3 × 8 = 24 = 4 × 6 (True)

Factor of change	The number by which both terms of a ratio are multiplied or divided to obtain an equivalent proportional ratio.	Ex: (60 : 40) × 1/2 =30:20. Factor = 1/2
Dividing in a Ratio	To divide quantity 'x' in the ratio m:n, then the parts are $\frac{m \times x}{m+n}$ and $\frac{n \times x}{(m+n)}$.	Ex: Rs.4000 in ratio 3:1 → Rs.3000 & Rs.1000
Proportional Quantities	Two pairs of quantities are proportional when their ratios change by the same multipli -cative factor (NOT additive).	Ex: 6 glasses:10 spoons :: 18 glasses : 30 spoons and $30 \times \frac{6}{10} = \frac{18}{30} \times 30$ $\Rightarrow 18 = 18$

Student corner-Reading and Practice

Instructions: Read the key terms carefully. Then attempt all questions on your own.

A. Fill in the blanks :

1. The Simplest from of 48 : 36 is _____.
2. If 5 :8 :: 15 :_____, the missing term is _____.
3. Divide Rs. 700 in ratio 2 : 5. The larger share = Rs. _____.

B. MCQs - Tick (✓) the correct answer.

4. Which pair of ratios is in proportion?
   (A) 2:3 and 4:5 (B) 3:4 and 9:12
   (C) 5:6 and 10:13 (D) 1:2 and 2:5
5. If a:b :: c:d, then by cross multiplication:
   (A) ab = cd (B) ac = bd (C) ad = bc (D) a+d = b+c

C. Match the following :

Column A		Column B
A. 60 : 40	( )	1. Simplest form is 2 : 1
B. 40 : 20	( )	2. Simplest form is 1 : 1
C. 90 : 30	( )	3. Simplest form is 3 : 2
D. 60 : 60	( )	4. Simplest form is 3 : 1

DAY 8 — 8. FRACTIONS IN DISGUISE

- **Key Terms :** Per Cent (%), Fraction, Equivalent Fraction, Percentage of a Quantity, Decimal, Percentage Increase, Percentage Decrease, Profit &Loss, Simple Interest.
- **Concept Explaination-Know the term :**

  Instructions: Introduce each term using definitions and examples. Connect each concept to a real-life example to build readiness.

Key Term	Definition	Example
Per Cent (%)	Per cent means 'out of 100'. The symbol % represents a fraction with denominator 100.	Ex: 25% = $\frac{25}{100}$. 50% = $\frac{50}{100}$ = 50%
Fraction to Percentage	Multiply the fraction by 100 to get the percentage. Fraction $\frac{x}{y} = \left(\frac{x}{y}\right) \times 100$ %.	Ex: $\frac{3}{4} = \left(\frac{3}{4} \times 100\right)$ % = 75%.
Equivalent Fraction	Fractions that represent the same value. Used to express fractions as percentages.	Ex: $\frac{3}{4} = \frac{6}{8} = \frac{75}{100}$ = 75%.
Percentage of a Quantity	To find p% of a quantity Q, calculate $(\frac{p}{100}) \times Q$.	Ex: 25% of 120 = $(\frac{25}{100}) \times 120 = 30$.
Decimal & Percentage	Percentages, fractions and decimals are interchange able. Divide the percentage by 100 to get decimal.	Ex: 40% = $\frac{40}{100}$ = 0.4.
Percentage Increase	When a value grows: the percentage increase = (Increase/Original) × 100.	Ex: Price Rs.30 to Rs.42: $(\frac{12}{30}) \times 100$ = 40%.

Percentage Decrease	When a value falls: The percentage decrease = $\frac{\text{Decrease}}{\text{Original}} \times 100$.	Ex: decrease 160 to 100 then decrease % $\left(\frac{60}{160}\right) \times 100 = 37.5\%$.
Profit & Loss	Profit % = (Profit/Cost Price) × 100. Loss % = (Loss/CP) x Profit or loss Always calculated on CP.	Ex: CP Rs.300, SP 100. Rs.430: Profit = 43.3%.
Simple Interest (No Compounding)	Simple Interest = $\frac{p \times t \times r}{100}$ Total amount = $P\left(1 + \frac{RT}{100}\right)$ Same interest earned each period.	Ex: Rs.6000 × 10% for 3 yrs = Rs.7800.

Student corner-Reading and Practice

Instructions: Read the key terms carefully. Then attempt all questions on your own.

A. Fill in the blanks :

1. 25% means _____ out of every 100.
2. Express 3/5 as a percentage _____.
3. 30% of Rs. 200 = Rs. _____.

B. MCQs - Tick (✓) the correct answer.

4. A shopkeeper buys an article for Rs. 80 and sells at Rs. 100. Profit % is:
   (A) 20% (B) 25% (C) 80% (D) 125%
5. The money Rs. 5000 at 10% p.a. for 2 years without compounding gives total money:
   (A) Rs. 5500 (B) Rs. 6000 (C) Rs. 6050 (D) Rs. 5050

C. Match the following :

Column A		Column B
A. 3/4	( )	1. 0.2
B. 1/5	( )	2. 0.75
C. 50%	( )	3. 60%
D. 3/5	( )	4. 0.5

DAY 9 — 9. THE BAUDHAYANA-PYTHAGORAS THEOREM

- **Key Terms :** Right Triangle, Hypotenuse, Legs / Perpendicular Sides, Square & Area, Diagonal, Baudha yana-Pythagoras Theorem, Irrational Number, Baudhayana Triple, Square Root, Congruence
- **Concept Explaination-Know the term :**

  Instructions: Introduce each term using definitions and examples. Connect each concept to a real-life example to build readiness.

Key Term	Definition	Example
Right Triangle	A triangle with one angle equal to exactly 90 degrees. The side opposite the right angle is always the longest side.	Ex: Triangle with sides 3, 4, 5 - angle is between sides 3 and 4 is right angle.
Hypotenuse	The side opposite the right angle in a right triangle. It is always the longest side of a right triangle.	Ex: In a 3-4-5 triangle, the hypotenuse is the side of length 5.
Legs (Shorter Sides)	The two sides of a right triangle that form the right angle. Also called perpendicular sides or 'a' and 'b' in the theorem.	Ex: In 3-4-5, the legs are 3 and 4.
Area of a Square	If a square has side length s, its area = $s \times s = s^2$. (Used to understand why the theorem works through areas.)	Ex: Square of side 4 has area = $4 \times 4 =$ 16 sq. units.
Diagonal of a Square	A line joining two opposite corners of a square. The diagonal of a square of side 'a' has length = $a \times \sqrt{2}$	Ex: Square of side 1 has diagonal = $a \times \sqrt{2} = 1 \times \sqrt{2} = 1.414...$

Baudhayana-Pythagoras Theorem	In a right triangle with legs a, b and hypotenuse c: $a^2 + b^2 = c^2$. First stated by Baudhayana (800 BCE).	Ex: $3^2 + 4^2 = 9 + 16 = 25 = 5^2$. So (3,4,5) works!
Square Root	The square root of a number n (written $\sqrt{(n)}$ is the value hat when multiplied by itself gives n.	Ex: $\sqrt{25} = 5$ because $5 \times 5 = 25$. $\sqrt{2} = 1.414$.
Baudhayana Triple	A set of three positive integers (a, b, c) that satisfy $a^2 + b^2 = c^2$. These form the sides of a right triangle.	Ex: (3,4,5), (5,12,13), (8,15,17) are all Baudhayana tripletss.
Irrational Number	A number that cannot be written as a simple fraction m/n and is a non-terminating, non-repeating decimal. (m, $n \in z$, $n \neq 0$)	Ex: $\sqrt{2} = 1.41421356..$ cannot be written as a fraction.

Student corner-Reading and Practice

Instructions: Read the key terms carefully. Then attempt all questions on your own.

A. Fill in the blanks :

1. In a right triangle, the side opposite the right angle is called the _____.
2. If a = 3 and b = 4 in a right triangle, then c = _____ (use $a^2 + b^2 = c^2$).
3. The lengh of the diagonal of a square of side 5 units is _____ units.

B. MCQs - Tick (✓) the correct answer.

4. Which set is a Baudhayana triple?
   (A) (2, 3, 4) (B) (5, 12, 13) (C) (4, 5, 8) (D) (6, 7, 9)
5. If $\sqrt{2} = 1.414...$, then $\sqrt{2}$ is:
   (A) A fraction (B) A terminating decimal
   (C) An irrational number (D) A whole number

DAY 10 — 10. PROPORTIONAL REASONING-2

- **Key Terms :** Ratio, Proportion, Cross Multiplication, Multi-term Ratio, Representative Fraction (RF), Direct Proportion, Inverse Proportion, Pie Chart, HCF
- **Concept Explaination-Know the term :**
  Instructions: Introduce each term using definitions and examples. Connect each concept to a real-life example to build readiness.

Term	Definition	Example
Ratio	A ratio is a way of comparing two or more quantities to show how their sizes relate to one another. It indicates how many times one number contains another	In the ratio a:b, a is called antecedent and b is called the consequent In 3:2, antecedent = 3 condequent = 2
Multi-term Ratio	A ratio with more than 2 terms, e.g., a:b:c. All terms change by the same factor when scaled up or down.	Ex: Spice mix 8:4:2:1 scaled to half = 4:2:1:0.5.
Proportion	Proportion is a statement that two ratios are equal. If a,b,c,d are in proportion then a:b = c:d	If 15, 20, 6, 8 are in proportion then 15 : 20 = 6:8
Representative Fraction (RF)	The ratio of a distance on the map to the actual ground distance. Used to find real-world distances from map distances.	Ex: RF 1:60,00,000 means 1 cm on map = 60 km real.
Direct Proportion	Two quantities are in direct proportional if when one increases, the other increases by the same factor. $\frac{x_1}{y_1} = \frac{x_2}{y_2} = k$ (constant).	Ex: More rice → more idlis. 5 workers make 4500 bricks; 20 workers make 18000 bricks.

Inverse Proportion	Two quantities are in inversely proportional if when one increases by factor n, the other decreases by factor n. $x_1 \times y_1 = x_2 \times y_2 = k$.	Ex: More speed → less time. More workers → fewer days.
Cross Multiplication	Cross multipication is a mathematical technique used to slove an equation involving to ratios or fractions.	If $\frac{a}{b} = \frac{c}{d}$ then axd = bxc If $\frac{x}{10} = \frac{3}{5}$ then, $5 \times x = 10 \times 3$ $5x = 30, \quad x = 6$
Pie Chart	A circle divided into slices where each slice's angle is proportional to the data it represents. Total angle = 360º.	Ex: 12 out of 40 students → angle = $\frac{12}{40} \times 360^{\circ} = 108º$.

Student corner-Reading and Practice

Instructions: Read the key terms carefully. Then attempt all questions on your own.

A. Fill in the blanks :

1. In inverse proportion, when one quantity doubles, the other quantity _____.
2. Divide 90 in the ratio 1:2:3. The three parts are _____, _____, _____.

B. MCQs - Tick (✓) the correct answer.

3. 4 workers finish a job in 6 days. 8 workers will finish it in:
   (A) 12 days (B) 3 days (C) 6 days (D) 24 days
4. Speed and time for a fixed distance are:
   (A) Directly proportional (B) Inversely proportional
   (C) Not related (D) Equal

DAY 11 — 11. EXPLORING SOME GEOMETRIC THEMES

- **Key Terms :** Fractal, Self-similarity, Net (of a solid), Face, Edge, Vertex, Projection, Isometric projection, Prism, Pyramid
- **Concept Explaination-Know the term :**

  Instructions: Introduce each term using definitions and examples. Connect each concept to a real-life example to build readiness.

Key Term	Definition	Example
Fractal	A shape that shows the same or similar pattern at smaller and smaller scales (self-similar).	A fern leaf - each sub-leaf looks like the whole fern.
Self-similarity	When smaller parts of a shape look the same as the whole shape.	Koch Snowflake - each bump has smaller bumps of the same shape.
Net of a solid	A flat 2D shape that can be folded to form a 3D solid.	6 squares joined in a cross pattern fold into a cube.
Face	A flat (plane) surface that forms the boundary of a solid.	A cube has 6 square faces.
Edge	A line segment where two faces of a solid meet.	A cube has 12 edges.
Vertex	A point (corner) where two or more edges of a solid meet.	A cube has 8 vertices.
Projection	The shadow-like flat image of a 3D object formed on a plane surface when light shines perpendicularly on it.	Top view of a cylinder is a circle.

Isometric projection	A special projection of a solid where the lengths of all projected edges are equal. Drawn on isometric (hexagonal) grid paper.	A cube balanced on its corner vertex gives an isometric (hexagon) projection.
Prism	A solid with two identical parallel polygon faces (Top & base) connected by rectangles (parallelograms).	A triangular prism has 2 triangular faces and 3 rectangular faces.
Pyramid	A solid with a polygon base and triangular Lateral faces meeting at a single apex (top point).	A square pyramid has a square base and 4 triangular faces.

Student corner-Reading and Practice

Instructions: Read the key terms carefully. Then attempt all questions on your own.

A. Fill in the blanks :

1. A shape that shows the same pattern at smaller and smaller scales is called a _____.
2. The flat 2D shape that can be folded to form a 3D solid is called the _____ of the solid.
3. A cube has _____ faces, _____ edges and _____ vertices.

B. MCQs - Tick (✓) the correct answer.

1. Which of the following is an example of a fractal found in nature?
   (a) Cube (b) Fern leaf (c) Cylinder (d) Net
2. The projection of a cube in which all edges appear equal in length is called:
   (a) Front view (b) Top view
   (c) Isometric projection (d) Side view

C. Match the following :

Column A			Column B
1. Fractal	( )	A)	Flat shape that folds into a solid
2. Vertex	( )	B)	Same pattern repeating at smaller scales
3. Net	( )	C)	A shape made by repeating a pattern at smaller scales
4. Self-similarity	( )	D)	Shadow-like flat image of a 3D object on a plane
5. Projection	( )	E)	Point where two or more edges meet

DAY 12 — 12. TALES BY DOTS AND LINES

- **Key Terms :** Mean (Average), Median, Central Tendency, Frequency, Line Graph, Spreadsheet, Data (Dataset), Infographic, Arithmetic Mean formula
- **Concept Explaination-Know the term :**

  Instructions: Introduce each term using definitions and examples. Connect each concept to a real-life example to build readiness.

Key Term	Definition	Example
Mean (Average)	Sum of all values divided by the number of values. It is the 'balance point' of the data.	Mean of 3,7,8 = $\frac{3+7+8}{3}$ = 18÷3 = 6
Median	The middle value when data is sorted in order. Half of the values of the data lie below it, half above.	Sorted: 3,5,7,9,11 → Median = 7
Central Tendency	A single value that represents the 'centre' or typical value of a data set.	Mean & Median are both measures of central tendency.
Frequency	The number of times a particular value appears in a data set.	In {4,4,4,7,9}, frequency of 4 is 3.
Line Graph	A graph where data points are connected by lines. Best used to show change over time.	Monthly temperature plotted over 12 months.
Spreadsheet	A digital table of rows and columns (cells) used to store and calculate data using formulae.	= AVERAGE(B2:B10) finds average of a column.

Data (Dataset)	A collection of information (numbers, facts) that is gathered for analysis.	Heights of 30 students is a dataset.
Infographic	A visual representation that combines images and data to communicate information clearly.	A map showing wheat vs. rice preference by state.
Arithmetic Mean formula	Mean = (Sum of all values) ÷ (Number of values). When all values increase by k, mean also increases by k.	Data: 4,6,8. Mean = 18÷3 = 6. Add 5 to each: New mean = 11.

Student corner-Reading and Practice

Instructions: Read the key terms carefully. Then attempt all questions on your own.

A. Fill in the blanks :

1. The _____ is found by adding all values and dividing by the count.
2. The _____ is the middle value when data is sorted in order.
3. A graph that shows data points connected by lines, used to show change over time, is called a _____.

B. MCQs - Tick (✓) the correct answer.

1. If the mean of 4, 6, 8, 10 is 7 and we add 3 to each value, the new mean is:
   (a) 7 (b) 10 (c) 21 (d) 3
2. The median of the data 3, 5, 7, 9, 11 is:
   (a) 5 (b) 6 (c) 7 (d) 9

C. Match the following :

Column A		Column B
1. Mean	( )	A) A graph connecting data points with lines
2. Median	( )	B) The middle value in sorted data
3. Frequency	( )	C) Number of times a value appears in data
4. Line Graph	( )	D) Sum of values divided by count

DAY 13 — 13. ALGEBRA PLAY

- **Key Terms :** Variable (Letter-number), Expression, Equation, Solving an equation, Distributive property, Divisibility, Number Pyramid, Substitution, Constant, Algebraic identity
- **Concept Explaination-Know the term :**

  Instructions: Introduce each term using definitions and examples. Connect each concept to a real-life example to build readiness.

Key Term	Definition	Example
Variable (Letter-number)	A letter used to represent an unknown number in an expression or equation.	x, a, b, M, D are variables.
Expression	A combination of numbers, variables and operations (no '=' sign).	$2x + 4$, $a + b$, $5M + 6$
Equation	A mathematical statement showing two expressions are equal (has an = sign).	$2x + 4 = 10$; $a + b = 60$
Solving an equation	Finding the value of the variable that makes the equation true.	$2x = 10 \rightarrow x = 5$
Distributive property	$a \times (b + c) = a \times b + a \times c$. Used to expand or factorise expressions.	$5(x+3) = 5x + 15$
Divisibility	A number is said to be divisible by n if dividing by n leaves remainder 0.	$27 \div 9 = 3$ (no remainder), so 27 is divisible by 9.
Number Pyramid	A structure where the value of each cell equals the sum of the two Values of the cells directly below it.	Bottom row: 3, 4 → Next level: 7 → Top: 7

Substitution	Replacing a variable with a specific number to evaluate an expression.	If a = 5, then a + 3 = 5 + 3 = 8.
Constant	A fixed number in an expression that does not change.	In 2x + 4, the number 4 is a constant.
Algebraic identity	An equation that is true for ALL values of the variables.	$(a+b)^2 = a^2 + 2ab + b^2$ is true for any a, b.

Student corner-Reading and Practice

Instructions: Read the key terms carefully. Then attempt all questions on your own.

A. Fill in the blanks :

1. A letter used to represent an unknown number in an expression is called a _____.
2. An expression that has an equal sign (=) is called an _____.
3. The rule a × (b + c) = a×b + a×c is called the _____ property.

B. MCQs - Tick (✓) the correct answer.

1. In the expression 3x + 7, the variable is:
   (a) 3 (b) x (c) 7 (d) 3x
2. Solve: 2x + 4 = 14. The value of x is:
   (a) 7 (b) 9 (c) 5 (d) 4

C. Match the following :

	Column A		Column B
1.	Variable	( )	A) Replacing a variable with a number to evaluate an expression
2.	Equation	( )	B) A statement showing two expressions are equal (uses = sign)
3.	Distributive Property	( )	C) A letter that represents an unknown number
4.	Divisibility	( )	D) A number leaves remainder 0 when divided by another number
5.	Substitution	( )	E) a × (b + c) = a×b + a×c

DAY 14 — 14. AREA

- **Key Terms :** Area, Perimeter, Base & Height, Altitude, Parallelogram, Trapezium, Rhombus, Diagonal
- **Concept Explaination-Know the term :**

  Instructions: Introduce each term using definitions and examples. Connect each concept to a real-life example to build readiness.

Term	Definition	Example
Area	The amount of 2D space covered by a flat shape, measured in square units.	e.g. 5 cm × 3 cm tile covers an area of 15 cm^2.
Perimeter	The total length of the boundary around a 2D shape.	e.g. 6 m × 4 m field has perimeter = 20 m.
Base & Height	Base = any chosen side; Height = perpendicular distance from that base to the opposite vertex/side.	e.g. In ΔABC, BC = 8 cm (base); altitude h = 5 cm.
Altitude	A perpendicular line segment drawn from a vertex to the opposite side (or its extension).	e.g. Altitude is always perpendicular to the base.
Parallelogram	A quadrilateral with two pairs of parallel sides. Opposite sides are equal in length.	e.g. In a parallelogram ABCD, AB$\parallel$CD, BC$\parallel$DA and AB=CD, BC=DA
Trapezium	A quadrilateral with exactly one pair of parallel sides a and b are called parallel sides	e.g. In a Trapezium ABCD, AB$\parallel$CD, AB=a CD=b

Rhombus	A parallelogram with all four sides equal. Diagonals bisect each other at right angles.	e.g. If ABCD is a Rhombus AB = BC = CD = DA
Diagonal	A line segment joining two non-adjacent vertices of a polygon; used to split shapes into triangles.	e.g. Drawing BD splits. quadrilateral ABCD into 2 triangles.

Student corner-Reading and Practice

Instructions: Read the key terms carefully. Then attempt all questions on your own.

A. Fill in the blanks :

1. Area of a triangle = $\frac{1}{2}$ × _____ × height.
2. A parallelogram with base 9 cm and height 4 cm has an area of ____ cm².
3. A rhombus with diagonals 10 cm and 6 cm has an area of _____ cm².

B. MCQs - Tick (✓) the correct answer.

1. A trapezium has parallel sides 8 cm and 12 cm, height 5 cm. Its area is:
   (A) 80 cm² (B) 50 cm² (C) 100 cm² (D) 60 cm²
2. Perimeter and area of a shape are:
   (A) Always equal
   (B) Both measured in cm²
   (C) Independent - same perimeter can give different areas
   (D) Interchangeable measures

C. Match the following :

Column A			Column B
1. Rectangle	( )	P.	$\frac{1}{2} \times d_1 \times d_2$
2. Triangle	( )	Q.	$l \times b$
3. Rhombus	( )	R.	$b \times h$
4. Parallelogram	( )	S.	$\frac{1}{2} \times b \times h$