

MORE
THAN
PRACTICE
A BRIGHTER
YOU

THINK
PRACTISE
SOLVE
GROW

CLASS 8 MATHEMATICS MASTERY WORKBOOK

Current NCERT Ganita Prakash 2026–27 | Parts 1 & 2

CONCEPTS
SKILLS
REASONING
CONFIDENCE

Practice • Application • Advanced Thinking
Competition • Olympiad Challenge

SAME
SYLLABUS
BIGGER
POSSIBILITIES

EXAM PREPARATION
+ SKILL BUILDING

$$a^m \times a^n = a^{m+n}$$

$$\frac{a}{b} = a : b$$

$$n^2$$

$$\sqrt{x}$$

$$x^2 + y^2 = c^2$$

$$\begin{array}{c} a \\ \text{---} \\ \text{---} \\ b \end{array} \quad c$$

$$V = s^3$$

Independent Educational Workbook

Based on the current NCERT Ganita Prakash curriculum.

Not an official NCERT or CBSE publication.

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How to Use This Book

Use the book like a complete study workbook. Start with the short concept review, work through the practice sections, then move on to the timed tests and challenge problems.

- Begin with the short concept review. Pause whenever a rule or idea is new, and make sure you can explain it in your own words.
- Try each question on your own before checking the answers. The difficulty tag is there to show the type of thinking a question needs; it is not a label for the student.
- After checking your work, note what went wrong: a concept, a calculation, the reading of the question, the reasoning, the timing, or simple carelessness.
- Use the progress card to decide whether to revise the chapter, retry a section, or move forward.
- Treat the final mock papers like real exams. Set the clock, put the answer book aside, and check your work only after you finish the paper.
- Save the Grand Topper Challenge for the end. These problems are intentionally unfamiliar and are meant to stretch your mathematical thinking.

Difficulty Tags

★ **Easy** Foundational, direct understanding.

★★ **Standard** Normal Class 8 exam-level application.

★★★ **Advanced** Multi-step, interpretive, or concept-combining.

★★★★ **Challenge** Non-routine reasoning or clever strategy.

Olympiad Deep, insight-driven problem solving appropriate for strong Class 8 students.

Contents

Chapter 1 - A Square and A Cube

Chapter 2 - Power Play

Chapter 3 - A Story of Numbers

Chapter 4 - Quadrilaterals

Chapter 5 - Number Play

Chapter 6 - We Distribute, Yet Things Multiply

Chapter 7 - Proportional Reasoning-1

Chapter 8 - Fractions in Disguise

Chapter 9 - The Baudhayana-Pythagoras Theorem

Chapter 10 - Proportional Reasoning-2

Chapter 1: A Square and A Cube

In this chapter, you will work with square and cube numbers, their roots, and the patterns that help you recognise them quickly.

Quick Concept Understanding

A square is a number multiplied by itself; a cube is multiplied by itself three times. Square roots and cube roots reverse those operations. Look for patterns in factors, last digits, and sums of odd numbers.

Key Ideas to Remember

n^2 , n^3 ; square/cube roots; odd-number and factor patterns.

Logical Thinking

1. [★★] What is 2025's square root?
2. [★★] Find the cube root of 2744.
3. [★★] How many integers lie strictly between 625 and 676?
4. [★★] Is 485 a perfect square? Give a reason.
5. [★★] Find the sum of the first 41 odd positive integers.
6. [★★★] A square has side 2 cm. Find its area and explain the result using a square-number pattern.
7. [★★★] Without calculating fully, compare 49 and 64.
8. [★★★] A cube has volume 125 cm^3 . Find its edge length.
9. [★★★] What is 361's square root?
10. [★★★] Find the cube root of 46656.

Application Practice

1. [★★★] What is 961's square root?
2. [★★★] Find the cube root of 343.
3. [★★★] How many integers lie strictly between 841 and 900?
4. [★★★] Is 65 a perfect square? Give a reason.

13. [★★] Find the sum of the first 7 odd positive integers.
14. [★★] A square has side 6 cm. Find its area and explain the result using a square-number pattern.
15. [★★] Without calculating fully, compare 100 and 121.

Competition-Style

1. [★★★★] What is 1156's square root?
2. [★★★★] Find the cube root of 46656.
3. [★★★★] How many integers lie strictly between 196 and 225?
4. [★★★★] Is 530 a perfect square? Give a reason.
5. [★★★★] Find the sum of the first 6 odd positive integers.
6. [★★★★] A square has side 9 cm. Find its area and explain the result using a square-number pattern.
7. [★★★★] Without calculating fully, compare 9 and 16.
8. [★★★★] A cube has volume 8 cm^3 . Find its edge length.
9. [★★★★] What is 169's square root?
10. [★★★★] Find the cube root of 54872.

Olympiad Level

1. [] What is 100's square root?
2. [] Find the cube root of 4913.
3. [] How many integers lie strictly between 361 and 400?
4. [] Is 145 a perfect square? Give a reason.
5. [] Find the sum of the first 43 odd positive integers.
6. [] A square has side 9 cm. Find its area and explain the result using a square-number pattern.
7. [] Without calculating fully, compare 100 and 121.
8. [] A cube has volume 8 cm^3 . Find its edge length.
9. [] What is 1369's square root?

10. [] Find the cube root of 29791.

Chapter Master Test

Suggested time: 25-30 minutes | Attempt without looking back at the chapter sections.

M1. [★★] Find the sum of the first 34 odd positive integers.

M2. [★★] A square has side 8 cm. Find its area and explain the result using a square-number pattern.

M3. [★★] Without calculating fully, compare 16 and 25.

M4. [★★] A cube has volume 64 cm^3 . Find its edge length.

M5. [★★] What is 900's square root?

M6. [★★★] Find the cube root of 13824.

M7. [★★★] How many integers lie strictly between 225 and 256?

M8. [★★★] Is 1682 a perfect square? Give a reason.

M9. [★★★] Find the sum of the first 29 odd positive integers.

M10. [★★★★] A square has side 2 cm. Find its area and explain the result using a square-number pattern.

My Chapter Progress Card

Measure	My Result
Practice completed	Yes / No
Master Test Score	___ / 10
Master Test Time	___ min
Logical thinking	Strong / Practice
Application	Strong / Practice
Advanced reasoning	Strong / Practice
Competition	Strong / Practice
Olympiad	Strong / Practice
Main mistake	Concept / Calculation / Reading / Reasoning /

Chapter 9: The Baudhayana-Pythagoras Theorem

In this chapter, you will investigate right triangles, the Pythagorean theorem, its converse, and useful number patterns involving the three sides.

Quick Concept Understanding

In a right triangle, the hypotenuse is opposite the right angle. The Pythagorean theorem links the three side lengths, while the converse can help identify right triangles.

Key Ideas to Remember

$a^2 + b^2 = c^2$ for right triangles; converse for testing a right triangle.

Logical Thinking

1. [★★] State the Pythagorean theorem for a right triangle.
2. [★★] State the Pythagorean theorem for a right triangle.
3. [★★] State the Pythagorean theorem for a right triangle.
4. [★★] A right triangle has legs 8 cm and 15 cm. Find the hypotenuse.
5. [★★] State the Pythagorean theorem for a right triangle.
6. [★★★] State the Pythagorean theorem for a right triangle.
7. [★★★] State the Pythagorean theorem for a right triangle.
8. [★★★] State the Pythagorean theorem for a right triangle.
9. [★★★] State the Pythagorean theorem for a right triangle.
10. [★★★] State the Pythagorean theorem for a right triangle.

Application Practice

1. [★★★] State the Pythagorean theorem for a right triangle.
2. [★★★] State the Pythagorean theorem for a right triangle.
3. [★★★] A right triangle has legs 8 cm and 6 cm. Find the hypotenuse.

Mock Paper 1

Suggested time: 60 minutes | Maximum marks: 40

Instructions: Attempt all questions. Show working for calculation and reasoning questions. Do not use the solutions until the paper is finished.

- Q1. [★★] (1 mark) Write 10,000,000 as a power of 10.
- Q2. [★★] (1 mark) Is 47 divisible by 3? Use its digit sum.
- Q3. [★★] (1 mark) Convert 50% to a fraction in simplest form.
- Q4. [★★] (1 mark) Name a 3D shape whose net can be made from 6 equal squares.
- Q5. [★★] (1 mark) Using $\pi = \frac{22}{7}$, find the area of a circle with radius 5 cm.
- Q6. [★★] (1 mark) A number is multiplied by -5 and then by -6. What is the sign of the final result?
- Q7. [★★] (1 mark) Find a convenient value of x that makes $7x + 21$ equal to 0.
- Q8. [★★★] (1 mark) State the Pythagorean theorem for a right triangle.
- Q9. [★★★★] (1 mark) Why must data be sorted before finding the median?
- Q10. [★★★★] (1 mark) What is 400's square root?
- Q11. [★★★★] (3 marks) A parallelogram has one angle 45° . Find the opposite angle.
- Q12. [★★★★] (3 marks) A car travels 240 km in 4 hours at constant speed. Find its speed.
- Q13. [★★★★] (3 marks) A machine makes 80 parts in 8 minutes. How many parts per minute?
- Q14. [★★★★] (3 marks) If $3x-5=16$, what is x ?
- Q15. [★★★★] (3 marks) Which is greater: 2^2 or 2^3 ? Explain without full multiplication.
- Q16. [★★★★] (3 marks) A number is divisible by 5. What can its units digit be?
- Q17. [★★★★] (3 marks) After a 75% increase, a quantity becomes 292. Find the original value.
- Q18. [★★★★] (3 marks) A solid has $F=6$, $V=8$ and $E=12$. Does it satisfy $V-E+F=2$?
- Q19. [★★★★] (3 marks) Find the area of a triangle with base 16 cm and height 4 cm.
- Q20. [★★★★] (3 marks) Which is larger: $\frac{7}{8}$ or $\frac{8}{8}$?

BONUS B: GRAND TOPPER CHALLENGE

Twenty-five problems for students who enjoy a serious challenge. Each one rewards observation, strategy, and mathematical insight more than lengthy calculation.

GC1 [Olympiad] Find the smallest positive integer that is both a perfect square and a perfect cube, and explain why.

GC2 [Olympiad] Without multiplying, compare 99^2 and $100^2 - 199$.

GC3 [Olympiad] A two-digit number becomes 27 larger when its digits are reversed. What can the difference between its digits be?

GC4 [Olympiad] The mean of 7 numbers is 18. If one number is removed, the mean of the remaining 6 is 16. What number was removed?

GC5 [Olympiad] A right triangle has integer sides and hypotenuse 13. Find all possible pairs of legs.

GC6 [Olympiad] If $x+y=10$ and $xy=21$, find x^2+y^2 .

GC7 [Olympiad] A number leaves remainder 1 when divided by 2, 3, and 4. What is the smallest such number greater than 20?

GC8 [Olympiad] A rectangle has area 96 cm^2 and integer sides. Which positive integer side lengths give the smallest perimeter?

GC9 [Olympiad] Three consecutive integers have sum 72. Find them.

GC10 [Olympiad] A ratio 3:5 is enlarged so the total becomes 64. Find the two parts.

GC11 [Olympiad] If $1+3+5+\dots+(2n-1)=225$, find n .

GC12 [Olympiad] A square and an equilateral triangle have the same perimeter. If the square side is 6 cm, what is the triangle side?

GC13 [Olympiad] Can a set of numbers have mean 10 and median 20? Give a short example.

GC14 [Olympiad] Find the value of 2^{10} without repeated multiplication by using powers of 2.

GC15 [Olympiad] A number is increased by 20% and then decreased by 20%. Is the final value unchanged?

GC16 [Olympiad] The diagonals of a rhombus are 10 cm and 24 cm. Find its area.

GC17 [Olympiad] Four people finish a fixed job in 18 days. At the same rate, how many days would six people take?

Final Self-Assessment: My Class 8 Maths Mastery Check

Use this page after you have worked through the chapters and mock papers. It is a simple record sheet for your own scores, observations, and next steps.

Area	My Score	Time	Next Step
Ch 1: A Square and A Cube	___	___	Revise / Continue
Ch 2: Power Play	___	___	Revise / Continue
Ch 3: A Story of Numbers	___	___	Revise / Continue
Ch 4: Quadrilaterals	___	___	Revise / Continue
Ch 5: Number Play	___	___	Revise / Continue
Ch 6: We Distribute, Yet Things Multiply	___	___	Revise / Continue
Ch 7: Proportional Reasoning-1	___	___	Revise / Continue
Ch 8: Fractions in Disguise	___	___	Revise / Continue
Ch 9: The Baudhayana-Pythagoras Theorem	___	___	Revise / Continue
Ch 10: Proportional Reasoning-2	___	___	Revise / Continue
Ch 11: Exploring Some Geometric Themes	___	___	Revise / Continue
Ch 12: Tales by Dots and Lines	___	___	Revise / Continue
Ch 13: Algebra Play	___	___	Revise / Continue
Ch 14: Area	___	___	Revise / Continue
Final Mock average	___ %	___ min	Revise / Continue

ANSWER BOOK

Answers and detailed solutions — use only after attempting the questions.

Chapter 1: A Square and A Cube

L1 Answer: 45

Solution: Because $45 \times 45 = 2025$, $\sqrt{2025} = 45$.

L2 Answer: 14

Solution: Because $14 \times 14 \times 14 = 2744$, the cube root is 14.

L3 Answer: 2

Solution: The integers are 626 and 627; so there are 2.

L4 Answer: No

Solution: $22^2 < 485 < 529$, so it lies between consecutive squares.

L5 Answer: 1681

Solution: The sum of the first n odd numbers is n^2 , so $41^2 = 1681$.

L6 Answer: 4 cm^2

Solution: Area = $p \times p = 2 \times 2 = 4 \text{ cm}^2$; this is the perfect square 4.

L7 Answer: 64 is larger

Solution: The second number is $(a+1)^2 = a^2 + 2a + 1$, which is greater by $2a + 1$.

L8 Answer: 5 cm

Solution: Edge length is the cube root of volume: $\sqrt[3]{125} = 5$.

L9 Answer: 19

Solution: Because $19 \times 19 = 361$, $\sqrt{361} = 19$.

L10 Answer: 36

Solution: Because $36 \times 36 \times 36 = 46656$, the cube root is 36.

A1 Answer: 31

Solution: Because $31 \times 31 = 961$, $\sqrt{961} = 31$.

A2 Answer: 7

Solution: Because $7 \times 7 \times 7 = 343$, the cube root is 7.

A3 Answer: 2

Solution: The integers are 842 and 843; so there are 2.

A4 Answer: No

Solution: $8^2 < 65 < 81$, so it lies between consecutive squares.

A5 Answer: 225

Solution: The sum of the first n odd numbers is n^2 , so $15^2 = 225$.

A6 Answer: 9 cm^2

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