

Squares, Square Roots, Cubes and Cube Roots

Mathematics · Class 8 · Topic-wise Practice Worksheet

TIME 45 minutes	QUESTIONS 18	TOTAL MARKS 24	MAX. SCORE ___ / 24
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Name: _____ Class/Sec: _____ Date: _____

INSTRUCTIONS

- There are **18 questions** in this worksheet. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–15 carry **1 mark** each. Questions 16–18 (Achievers Section) carry **3 marks** each.
- There is no negative marking. Use of a calculator is **not** allowed.
- Rough work may be done on the blank space at the side of each page.

Section A — Mathematical Reasoning

Q1–Q8 · 1 mark each

1. Which of the following is a perfect square?

- (A) 121 (B) 122
(C) 123 (D) 124

2. The digit in the units place of 27^2 is _____.

- (A) 4 (B) 7
(C) 9 (D) 1

3. A perfect square can **never** end in the digit _____.

- (A) 1 (B) 4
(C) 6 (D) 8

4. $\sqrt{1024} =$ _____.

- (A) 24 (B) 28
(C) 32 (D) 34

5. The cube of 12 is _____.

- (A) 144 (B) 1440
(C) 1728 (D) 1278

6. The cube root of 2744 is _____.

- (A) 12 (B) 14
(C) 16 (D) 18

7. How many natural numbers lie strictly between 9^2 and 10^2 ?

- (A) 9 (B) 10
(C) 18 (D) 19

8. $\sqrt{0.09} =$ _____.

- (A) 0.03 (B) 3
(C) 0.9 (D) 0.3

9. The dot patterns below show the first four square numbers. How many dots will the **8th** pattern contain?

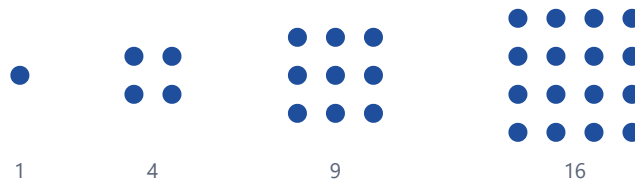


Fig. 9.1 — Square number patterns

- (A) 32 (B) 48
(C) 64 (D) 81
10. What is the smallest number by which 252 must be **multiplied** so that the product is a perfect square?
(A) 3 (B) 5
(C) 7 (D) 9
11. What is the smallest number by which 1080 must be **divided** so that the quotient is a perfect cube?
(A) 3 (B) 5
(C) 8 (D) 15
12. The area of a square field is 1156 m^2 . Find the cost of fencing it all round at ₹25 per metre.
(A) ₹3400 (B) ₹850
(C) ₹1156 (D) ₹6800
13. A ladder rests against a wall so that its foot is 15 m from the wall and its top is 20 m up the wall. What is the length of the ladder?
(A) 40 m (B) 30 m
(C) 35 m (D) 25 m
14. A gardener plants 2025 saplings so that the number of rows equals the number of saplings in each row. How many rows are there?
(A) 35 (B) 45
(C) 55 (D) 65
15. The cube root of 0.008 is _____.
(A) 0.2 (B) 0.02
(C) 0.4 (D) 2

Achievers Section

Q16–Q18 · 3 marks each

- 16.** Consider the following statements.
- (i) The square of every odd number is odd.
 - (ii) $\sqrt{a} \times \sqrt{b} = \sqrt{(ab)}$ for all positive numbers a and b .
 - (iii) Every natural number has a natural number as its square root.
- Which of the statements is/are correct?
- (A)** (i) and (ii) only **(B)** (ii) and (iii) only
(C) (i) and (iii) only **(D)** All three

17. What is the smallest four-digit number that is a perfect square?

(A) 1000

(B) 1024

(C) 1089

(D) 1156

18. Find the value of $\sqrt{1.21} + \sqrt[3]{0.027}$.

(A) 1.5

(B) 1.13

(C) 1.24

(D) 1.4

Answer Key

1	A	2	C	3	D	4	C	5	C
6	B	7	C	8	D	9	C	10	C
11	B	12	A	13	D	14	B	15	A
16	A	17	B	18	D				

Solutions

1. Answer: (A) 121

$121 = 11 \times 11 = 11^2$, so it is a perfect square. The others lie between $11^2 = 121$ and $12^2 = 144$ and are therefore not perfect squares.

2. Answer: (C) 9

The units digit of a square depends only on the units digit of the number. Here $7 \times 7 = 49$, whose units digit is **9**. (In fact $27^2 = 729$.)

3. Answer: (D) 8

Squaring the digits 0–9 gives units digits 0, 1, 4, 9, 6, 5, 6, 9, 4, 1. So a perfect square can only end in 0, 1, 4, 5, 6 or 9 — never in 2, 3, 7 or **8**.

4. Answer: (C) 32

$1024 = 2^{10}$, so $\sqrt{1024} = 2^5 = \mathbf{32}$. Check: $32 \times 32 = 1024$. ✓

5. Answer: (C) 1728

$12^3 = 12 \times 12 \times 12 = 144 \times 12 = \mathbf{1728}$.

6. Answer: (B) 14

2744 ends in 4, so the cube root ends in 4. Ignoring the last three digits leaves 2, and $1^3 = 1 \leq 2 < 8 = 2^3$, so the tens digit is 1. Hence the cube root is **14**. Check: $14^3 = 2744$. ✓

7. Answer: (C) 18

Between n^2 and $(n + 1)^2$ there are exactly $2n$ natural numbers. Here $n = 9$, so there are $2 \times 9 = \mathbf{18}$ numbers, namely 82 to 99.

8. Answer: (D) 0.3

$0.09 = \frac{9}{100}$, so $\sqrt{0.09} = \frac{3}{10} = \mathbf{0.3}$. Check: $0.3 \times 0.3 = 0.09$. ✓

9. Answer: (C) 64

The n th pattern is an $n \times n$ square of dots, so it holds n^2 dots: 1, 4, 9, 16, ... For $n = 8$ the count is $8^2 = \mathbf{64}$.

10. Answer: (C) 7

Prime factorise: $252 = 2 \times 2 \times 3 \times 3 \times 7 = 2^2 \times 3^2 \times 7$.

For a perfect square every prime must appear an even number of times. Here 7 appears once, so we multiply by **7**, giving $1764 = 42^2$.

11. Answer: (B) 5

$1080 = 2^3 \times 3^3 \times 5$.

For a perfect cube every prime must appear a number of times that is a multiple of 3. The prime 5 appears once, so dividing by **5** leaves $216 = 6^3$.

12. Answer: (A) ₹3400

Side = $\sqrt{1156} = 34$ m (since $34^2 = 1156$).

Perimeter = $4 \times 34 = 136$ m.

Cost = $136 \times 25 = \mathbf{₹3400}$.

13. Answer: (D) 25 m

By Pythagoras' theorem the length is $\sqrt{(15^2 + 20^2)} = \sqrt{(225 + 400)} = \sqrt{625} = \mathbf{25}$ m.

14. Answer: (B) 45

We need $\sqrt{2025}$. Since $2025 = 81 \times 25$, $\sqrt{2025} = 9 \times 5 = \mathbf{45}$. So there are 45 rows of 45 saplings each.

15. Answer: (A) 0.2

$0.008 = \frac{8}{1000}$, so the cube root is $\frac{2}{10} = \mathbf{0.2}$. Check: $0.2 \times 0.2 \times 0.2 = 0.008$. ✓

16. Answer: (A) (i) and (ii) only

Statement (i) is true — an odd number is $2k + 1$ and its square $4k^2 + 4k + 1$ is again odd. Statement (ii) is true for positive a and b , for example $\sqrt{4} \times \sqrt{9} = 2 \times 3 = 6 = \sqrt{36}$. Statement (iii) is false; $\sqrt{2}$ is not a natural number. Hence **(i) and (ii)**.

17. Answer: (B) 1024

We need the smallest n with $n^2 \geq 1000$. Now $31^2 = 961$, which is a three-digit number, and $32^2 = \mathbf{1024}$, which is four digits. So 1024 is the answer. ($1089 = 33^2$ and $1156 = 34^2$ are perfect squares too, but larger.)

18. Answer: (D) 1.4

$\sqrt{1.21} = \sqrt{\frac{121}{100}} = \frac{11}{10} = 1.1$, since $1.1 \times 1.1 = 1.21$.

$\sqrt[3]{0.027} = \sqrt[3]{\frac{27}{1000}} = \frac{3}{10} = 0.3$, since $0.3 \times 0.3 \times 0.3 = 0.027$.

Sum = $1.1 + 0.3 = \mathbf{1.4}$.