

# Class 8: Square Roots & Cube Roots - Exercise 7A

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1. Find the square of each of the following numbers

- i. Square of 14 =  $14 \times 14 = 196$
- ii. Square of 137 =  $137 \times 137 = 18769$
- iii. Square of  $\frac{4}{17} = \frac{16}{289}$
- iv. Square of  $2\frac{3}{4} = \frac{121}{16}$
- v. Square 0.01 =  $0.01 \times 0.01 = 0.0001$
- vi. Square of 1.2 =  $1.2 \times 1.2 = 1.44$
- vii. Square of 0.17 =  $0.17 \times 0.17 = 0.0289$
- viii. Square of 4.6 =  $4.6 \times 4.6 = 21.16$

2. Using prime factorization method, find which of the following are perfect square numbers: *Note: A natural number is called a perfect square, if it is the square of some natural number*

- i.  $196 = 14 \times 14$  (hence perfect square)
- ii.  $252 = 2 \times 2 \times 7 \times 3 \times 3$  (not a perfect square)
- iii.  $324 = 18 \times 18$  (hence perfect square)
- iv.  $1225 = 35 \times 35$  (hence a perfect square)
- v.  $2916 = 54 \times 54$  (hence perfect square)
- vi.  $3582 = 2 \times 3 \times 3 \times 199$  (not a perfect square)
- vii.  $4489 = 67 \times 67$  (hence a perfect square)

3. Which of the following numbers are squares of even numbers? *Note: The Square of an even number is always an even number.*

- i. 676, 1089, 5625, 729, 2304, 9216. Hence 676 (square of 26) 2304 (square of 48) and 9216 (square of 96) are square of even numbers.

4. Using prime factorization method, find the square root of each of the following numbers:

- i.  $441 = 3 \times 7 \times 3 \times 7$ . Therefore square root of 441 =  $3 \times 7 = 21$
- ii.  $784 = 4 \times 7 \times 4 \times 7$ . Therefore square root of 784 =  $4 \times 7 = 28$

- iii.  $3969 = 7 \times 9 \times 7 \times 9$ . Therefore square root of  $3969 = 7 \times 9 = 63$
- iv.  $4900 = 7 \times 10 \times 7 \times 10$ . Therefore square root of  $4900 = 70$
- v.  $11025 = 3 \times 7 \times 5 \times 3 \times 7 \times 5$ . Therefore square root of  $11025 = 3 \times 7 \times 5 = 105$
- vi.  $30625 = 5 \times 5 \times 7 \times 5 \times 5 \times 7$ . Therefore square root of  $30625 = 5 \times 7 \times 5 = 175$

5. The students of a class arranged a picnic. Each student contributed as many rupees as the number of students in the class. If the total contribution is Rs. 2601, find the strength of the class.

Let the number of students =  $x$

Each student contributed  $x$  Rupees.

Therefore  $x^2 = 2601$  or  $x = 51$

6. Find the smallest number by which 588 be multiplied to get a perfect square number.

$588 = 2 \times 2 \times 7 \times 3 \times 7$ . Therefore multiply by 3 to get a perfect square

7. Find the smallest number by which 2400 be multiplied to get a perfect square number. Find the square root of the resulting number.

$2400 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 5$ . Therefore multiply by 6. The square root would be 120

8. Find the smallest number by which 2592 be multiplied to get a perfect square number.

- i. What is the perfect square number so obtained?

$2592 = 2 \times 2 \times 2 \times 2 \times 2 \times 9 \times 9$ . Therefore smallest number to be multiplied to 2592 to get a perfect square is 2. Perfect square number = 5184

- ii. What is the square root of the resulting number?

Square root of the resulting number is 72

9. Find the smallest number by which 1728 be divided to get a perfect square number.

- i. What is the perfect square number so obtained?

$1728 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3$ . Hence divide it by 3. The number would be 576

- ii. Find the square root of this number.

Square root = 24

10. Find the smallest number by which 7776 be divided to get a perfect square number.

i. What is the resulting number?

$7776 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 9 \times 9$ . Hence divide this by 6. The number would be 1296

ii. What is the square root of the number so obtained?

Square root = 36

11. Find the least square number which is exactly divisible by each of the numbers 8, 9, 10 and 15.

$$8 = 2 \times 2 \times 2$$

$$9 = 3 \times 3$$

$$10 = 2 \times 5$$

$$15 = 3 \times 5$$

Therefore the number is  $2 \times 2 \times 2 \times 5 \times 3 \times 3 = 360$

12. Find the square root of each of the following by division method

i. 961

$$\begin{array}{r} 3 \quad \boxed{9 \quad 61} \quad \underline{31} \\ \quad 9 \\ \hline 61 \quad \boxed{0 \quad 61} \\ \quad \quad 61 \\ \hline \quad \quad 0 \end{array}$$

iv. 225625

$$\begin{array}{r} 4 \quad \boxed{22 \quad 56 \quad 25} \quad \underline{475} \\ \quad 16 \\ \hline 87 \quad \boxed{6 \quad 56} \\ \quad \quad 6 \quad 09 \\ \hline 945 \quad \boxed{47 \quad 25} \\ \quad \quad \quad 47 \quad 25 \\ \hline \quad \quad \quad 0 \end{array}$$

ii. 5476

$$\begin{array}{r} 7 \quad \boxed{54 \quad 76} \quad \underline{74} \\ \quad 49 \\ \hline 144 \quad \boxed{5 \quad 76} \\ \quad \quad 5 \quad 76 \\ \hline \quad \quad 0 \end{array}$$

v. 4401604

$$\begin{array}{r} 4 \quad \boxed{4 \quad 40 \quad 16 \quad 04} \quad \underline{2098} \\ \quad 4 \\ \hline 409 \quad \boxed{40 \quad 16} \\ \quad \quad 36 \quad 81 \\ \hline 4188 \quad \boxed{3 \quad 35 \quad 04} \\ \quad \quad \quad 3 \quad 35 \quad 04 \\ \hline \quad \quad \quad 0 \end{array}$$

iii. 11449

$$\begin{array}{r} 1 \quad \boxed{1 \quad 14 \quad 49} \quad \underline{107} \\ \quad 1 \\ \hline 207 \quad \boxed{0 \quad 14 \quad 49} \\ \quad \quad 14 \quad 49 \\ \hline \quad \quad 0 \end{array}$$

vi. 9653449

$$\begin{array}{r}
 3 \quad \boxed{9 \quad 65 \quad 34 \quad 49} \quad \boxed{3107} \\
 \quad \quad \quad 9 \\
 \hline
 61 \quad \quad \quad 65 \\
 \quad \quad \quad \quad 61 \\
 \hline
 6207 \quad \quad 4 \quad 34 \quad 49 \\
 \quad \quad \quad \quad 4 \quad 34 \quad 49 \\
 \hline
 \quad \quad \quad \quad \quad \quad 0
 \end{array}$$

13. The area of a square field is 77841 sq. meters. Find its perimeter.

$$\text{Area} = \text{side} \times \text{side} = 77841 = 279 \text{ meter}$$

$$\text{Perimeter} = 4 \times \text{side} = 4 \times 279 = 1116 \text{ sq. meters}$$

14. Find the least number which must be subtracted from 7581 to obtain a perfect square.

Find this perfect square and its square root. .

$$\begin{array}{r}
 8 \quad \boxed{75 \quad 81} \quad \boxed{87} \\
 \quad \quad \quad 64 \\
 \hline
 167 \quad \quad 11 \quad 81 \\
 \quad \quad \quad 11 \quad 69 \\
 \hline
 \quad \quad \quad \quad \quad 12
 \end{array}$$

Subtract 12 from 7581 to obtain a perfect square. The number would be 7569 and the square root would be 87.

15. Find the least number which must be subtracted from 43379 to obtain a perfect square.

Find this perfect square and its square root.

$$\begin{array}{r}
 2 \quad \boxed{4 \quad 33 \quad 79} \quad \boxed{208} \\
 \quad \quad \quad 4 \\
 \hline
 207 \quad \quad 0 \quad 33 \quad 79 \\
 \quad \quad \quad \quad 32 \quad 64 \\
 \hline
 \quad \quad \quad \quad \quad 1 \quad 15
 \end{array}$$

Subtract 115 from 43379 to obtain perfect square

16. Find the least number which must be added to 6203 to obtain a perfect square. Find the perfect square and its square root.

$$7 \quad \boxed{62 \quad 03} \quad \boxed{78}$$

$$\begin{array}{r|l}
 & 49 \\
 148 & 13 \quad 03 \\
 & 11 \quad 84 \\
 \hline
 & 1 \quad 19
 \end{array}$$

Therefore  $78^2 < 7203 < 79^2$

$$79^2 = 6241$$

Therefore add  $(6241 - 6203) = 38$  to 6203 to obtain a perfect square (6241).

Its square root would be 79

17. Find the least number which must be added to 506900 to make it a perfect square. Find this perfect square and its square root.

$$\begin{array}{r|l}
 7 & 50 \quad 69 \quad 00 & 711 \\
 & 49 & \\
 \hline
 141 & 1 \quad 69 & \\
 & 1 \quad 41 & \\
 \hline
 1421 & 28 \quad 00 & \\
 & 14 \quad 28 & 
 \end{array}$$

Therefore  $711^2 < 506900 < 712^2$

$$712^2 = 506944$$

Therefore add 44 to 506900 to make it a perfect square of 712.

18. Find the greatest number of six digits, which is a perfect square. Find the square root of this number.

$$\begin{array}{r|l}
 9 & 99 \quad 99 \quad 99 & 999 \\
 & 81 & \\
 \hline
 & 18 \quad 99 & \\
 & 17 \quad 01 & \\
 \hline
 & 1 \quad 98 \quad 99 & \\
 & 1 \quad 79 \quad 01 & \\
 \hline
 & 19 \quad 98 & 
 \end{array}$$

Subtract 1998 from 999999 to make a perfect square. The number is 998001.

19. Find the least number of four digits which is a perfect square.

$$\begin{array}{r|l}
 3 & 10 \quad 00 & 31 \\
 & 9 & 
 \end{array}$$

$$\begin{array}{r} 1 \quad 00 \\ \quad 61 \\ \hline \quad 39 \end{array}$$

Therefore  $31^2 < 1000 < 32^2$

$$32^2 = 1024$$

Therefore add 24 to 1000 to get the least number of four digits which is a perfect square which is 1024.

20. Find the least number by which 69192 must be (i) decreased (ii) increased (iii) multiplied (iv) divided to make it a perfect square.

$$\begin{array}{r} 2 \quad \begin{array}{|l} 6 \quad 91 \quad 92 \\ 4 \\ \hline 2 \quad 91 \\ 2 \quad 76 \\ \hline 15 \quad 92 \\ 15 \quad 69 \\ \hline 23 \end{array} \quad 263 \\ 46 \\ 52 \end{array}$$

- i. Subtract 23 from 69192 to make it a perfect square.
- ii.  $263^2 < 69191 < 264^2$ ,  $264^2 = 69696$ . Therefore add 504 to 69192 to make it a perfect square.
- iii.  $69192 = 2 \times 2 \times 2 \times 3 \times 3 \times 31 \times 31$ . Therefore multiply by 2 to make it a perfect square
- iv. Or divide it by 2 to make it a perfect square.