

GreyQuanta Educare**Website: greyquanta.com****Grade 8 Mathematics: Squares and Square Roots****Time: 1 hour 30 minutes****Max Marks: 40****Section A: Objective Type Questions (1 mark each)**

1. Find the square of 15.
 2. Which of the following numbers is a perfect square?
 - a) 50
 - b) 81
 - c) 60
 - d) 90
 3. True or False: $\sqrt{100} = 20$
-

Section B: Short Answer Questions (Type I) (2 marks each)

4. Write down the square roots of the following perfect squares:
 - a) 121
 - b) 144
 5. Find the square root of 25 by repeated subtraction method.
 6. Determine the smallest number by which 180 should be multiplied to make it a perfect square.
-

Section C: Short Answer Questions (Type II) (3 marks each)

7. Calculate the square root of 256 using the prime factorization method.
 8. If the area of a square field is $289 m^2$, find the length of each side of the field.
 9. Find the smallest number by which 180 should be divided to make it a perfect square.
-

Section D: Long Answer Questions (4 marks each)

10. Find the square root of 2025 by the long division method.
 11. If the square of a number is 625, find the original number.
Also, verify your answer by finding the square of your answer.
 12. Explain and solve: How many non-square numbers lie between 10^2 and 11^2
-

Section E: Application-based and Higher-order Thinking Skills (HOTS) (5 marks each)

GreyQuanta Educare

Website: greyquanta.com

13. A square-shaped park has an area $1936 m^2$. A path of width 3 m runs along the boundary inside the park. Find the area of the remaining park after the path is constructed.
14. The product of two numbers is 1764, and A wire is bent in the form of a square of $400 cm^2$. If the same wire is re-bent to form a circle, find the radius of the circle. (Use $\pi=3.14$)
15. one of them is 42. Find the other number using the square root concept.

SOLUTION at Bottom**SOLUTION**

Section A: Objective Type Questions

1. **Find the square of 15.**
Solution: $15^2 = 225$
2. **Which of the following numbers is a perfect square?**
Solution: 81 is a perfect square because $9^2 = 81$
3. **True or False: $\sqrt{100} = 20$** False, because $\sqrt{100} = 10$

Section B: Short Answer Questions (Type I)

4. Write down the square roots of the following perfect squares:

a) $\sqrt{121} = 11$

b) $\sqrt{144} = 12$

5. Find the square root of 25 by repeated subtraction method.

Solution:

$$25 - 1 = 24$$

$$24 - 3 = 21$$

$$21 - 5 = 16$$

$$16 - 7 = 9$$

$$9 - 9 = 0$$

Since 5 steps were taken $\sqrt{25} = 5$.

6. Determine the smallest number by which 180 should be multiplied to make it a perfect square.

Solution:

$$\text{Prime factorization of } 180 = 2^2 \times 3^2 \times 5^2$$

To make it a perfect square, multiply by 5 $\rightarrow 180 \times 5 = 900$, which is 30^2 .

Section C: Short Answer Questions (Type II)

7. Calculate the square root of 256 using the prime factorization method.

Solution:

$$256 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$\text{Grouping in pairs: } (2^4)^2 = 16^2$$

$$\text{So, } \sqrt{256} = 16$$

8. If the area of a square field is 289 m^2 , find the length of each side of the field.

Solution:

$$\text{Side} = \sqrt{289 \text{ m}^2} = 17 \text{ m}$$

9. Find the smallest number by which 180 should be divided to make it a perfect square.

Solution:

$$\text{Prime factorization of } 180 = 2^2 \times 3^2 \times 5^2$$

To make it a perfect square, multiply by 5 $\rightarrow 180 \div 5 = 36$, which is 6^2 .

Section D: Long Answer Questions

10. Find the square root of 2025 by the long division method.

Solution:

Using the long division method:

$$\sqrt{2025} = 45.$$

11. If the square of a number is 625, find the original number.

Solution:

$$\sqrt{625} = 25$$

12. How many non-square numbers lie between 10^2 and 11^2 ?

Solution: $121 - 100 - 1 = 20$

Between 100 and 121, there are 20 numbers in total. All are non-square numbers

Section E: Application-based and Higher-order Thinking Skills (HOTS)

13. A square-shaped park has an area 1936 m^2 . A path of width 3 m runs along the boundary inside the park. Find the area of the remaining park after the path is constructed.

Solution:

$$\text{Side of park} = \sqrt{1936} = 44 \text{ m}$$

$$\text{After a path of width 3m on all sides, the inner square's side} = 44 - 2 \times 3 = 38 \text{ m}$$

$$\text{Area of inner park} = 38^2 = 1444 \text{ m}^2$$

14. The product of two numbers is 1764, and one of them is 42. Find the other number using the square root concept.

Solution:

$$\text{Other number} = \frac{1764}{42} = 42$$

15. A wire is bent in the form of a square of 400 cm^2 . If the same wire is re-bent to form a circle, find the radius of the circle. (Use $\pi=3.14$)

Solution:

$$\text{Side of square} = \sqrt{400} = 20$$

$$\text{Perimeter of square} = 4 \times 20 = 80 \text{ cm}$$

$$\text{Circumference of circle} = 80$$

$$\text{Radius } r = \frac{80}{2\pi} = \frac{80}{2 \times 3.14} \approx 12.74 \text{ cm}$$