8^{th} Square and Square root + 8^{th} Cube and Cube root Worksheet

⇒ A number is called a perfect square if it is expressed as the square of a number e.g. 1, 4, 9, 16, 25

⇒ In square numbers, the digits at the unit's place are always 0, 1, 4, 5, 6 or

⇒ The numbers having 2, 3, 7 or 8 at its units' place are not perfect square numbers.

⇒ If a number has 1 or 9 in the unit's place then its square ends in 1.

⇒ If a number has 2 or 8 in the unit's place then its square ends in 4

⇒ If a number has 3 or 7 in the unit's place then its square ends in 9.

⇒ If a number has 4 or 6 in the unit's place then its square ends in 6.

⇒ When a number ends with '0' , its square ends with double zeros[Even number of zeros].

⇒ If a number ends with odd number of zeros then it is not a perfect square.

⇒ Squares of even numbers are even.

⇒ Squares of odd numbers are odd.

⇒Addition of n consecutive odd numbers[1 + 3 + 5 + 7 + ------+ *n*] = n^2

⇒ **Square roots :** When a number is multiplied by itself, the product is called the square of that number.

The number itself is called the **square root** of the product.

⇒If a perfect square has '*n*' digits where n is even, its square root has n/2 digits.

⇒ If a perfect square has 'n' digits where n is odd, its square root has (*n+1*)/2 digits.

⇒ **Perfect cubes** or **cube numbers** are obtained when a number is multiplied by itself three times

⇒ When a negative number is multiplied by itself an even number of times, the product is positive.

⇒ when it is multiplied by itself an odd number of times, the product is also negative.

⇒ For numbers with their unit's digit as 1, their cubes also will have the unit's digit as 1.

For example: 1^3 =1 ; 11^3 = 1331 ; 21^3 =9261 ; 31^3 =29791.

2. The cubes of the numbers with 1, 4, 5, 6, 9 and 0 as unit digits will have the same unit digits.

For example: $14^{3=}$ 2744 ; 15^3 =3375 ; 16^3 =4096 ; 20^3 =8000 .

3. The cube of numbers ending in unit digit 2 will have a unit digit 8 and the cube of the numbers ending in unit digit 8 will have a unit digit 2.

For example: 12^3 =1728 ; 18^3 =5832.

4. The cube of the numbers with unit digits as 3 will have a unit digit 7 and the cube of numbers with unit digit 7 will have a unit digit 3.

For example: 13^3 = 2197 ; 27^3 =19683 .

5. The cubes of even numbers are all even; and the cubes of odd numbers are all odd.

Q. Find the perfect square numbers between

(i) 10 and 20 (ii) 50 and 60 (iii) 80 and 90.

Solution

(i) The perfect square number between 10 and 20 is 16.

(ii) There is no perfect square number between 50 and 60.

(iii) The perfect square number between 80 and 90 is 81

Q. By observing the unit's digits, which of the numbers 3136, 867 and 4413 can not be perfect squares?

Solution: Since 6 is in units place of 3136, there is a chance that it is a perfect square. 867 and 4413 are surely not perfect squares as 7 and 3 are the unit digit of these numbers.

Q. Write down the unit digits of the squares of the following numbers:

(i) 24 (ii) 78 (iii) 35

Solution

(i) The square of 24 = 24 × 24. Here 4 is in the unit place.

Therefore, we have 4#4 = 16. ` 6 is in the unit digit of square of 24.

(ii) The square of 78 = 78 × 78. Here, 8 is in the unit place.

Therefore, we have 8 × 8 = 64. ` 4 is in the unit digit of square of 78

(iii) The square of 35 = 35 × 35. Here, 5 is in the unit place.

Therefore, we have 5 # 5 = 25. ` 5 is in the unit digit of square of 35.

Q. Why 45, 55 are Kaprekar numbers?

Answer: (i) 452 = 2025 = $(20+25)^2$ (ii) 552 = 3025 = $(30 + 25)^2$

Q. Find the sum of the following numbers without actually adding the numbers.

(i) 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15

(ii) 1 + 3 + 5 + 7

(iii) 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17

Q. Express the following as a sum of consecutive odd numbers starting with 1

(i) 7^2 (ii) 9^2 (iii) 5^2 (iv) 11^2

Q. Find the least number by which 200 must be multiplied to make it a perfect square. [2]

Q. Find the least number by which 384 must be divided to make it a perfect square [3x2]

Q. Find the square root of 529 using long division method.

Q. Find the square root of 6.0516

Q. Find the least number, which must be subtracted from 3250 to make it a perfect square

```
        5  7
   5 | 32 50
     | 25
 107 |  7 50
     |  7 49
     |      1
```

This shows that 57^2 is less than 3250 by 1. If we subtract the remainder from the number, we get a perfect square. So the required least number is 1.

Q. Find the least number, which must be added to 1825 to make it a perfect square

```
       4  2
  4 | 18 25
    | 16
 82 |  2 25
    |  1 64
    |    61
```

This shows that $42^2 < 1825$

Next perfect square is 43^2 = 1849 2 .

Hence, the number to be added is 43^2 - 1825 2- = 1849 – 1825 = 24.

Q. Find the square root of 3 correct to two places of decimal.

Q. Find the length of the side of a square where area is 441 m^2 .

Q. Is 500 a perfect cube?

Q. Is 243 a perfect cube? If not find the smallest number by which 243 must be multiplied to get a perfect cube

[3,729]

Q. Find the cube root of (a)512.(b) 27 x 64

Q. Is 250 a perfect cube? If not, then by which smallest natural number should 250 be divided so that the quotient is a perfect cube? [2]

Q. Find the cube root of . 125/216 and - 512/1000

Q. Find the cube root of 0.027

Q. $find\ the\ value\ of\ \frac{\sqrt[3]{729}-\sqrt[3]{27}}{\sqrt[3]{512}+\sqrt[3]{343}}$

Q. The volume of a cubical box is 19.683 cu. cm. Find the length of each side of the box.

Q. $a^{(x-y)z}\ \ a^{(y-z)x}\ a^{(z-x)y} = 1$

Q. Show that If 'a' is a rational number other than "zero", then $a^0 = 1$

MCQ

(i) Which of the following numbers is a perfect cube? (A) 125 (B) 36 (C) 75 (D) 100

(ii) Which of the following numbers is not a perfect cube?

(A) 1331 (B) 512 (C) 343 (D) 100

(iii) The cube of an odd natural number is

(A) Even (B) Odd

(C) May be even, May be odd (D) Prime number

(iv) The number of zeros of the cube root of 1000 is

(A) 1 (B) 2 (C) 3 (D) 4

(v) The unit digit of the cube of the number 50 is

(A) 1 (B) 0 (C) 5 (D) 4

(vi) The number of zeros at the end of the cube of 100 is

(A) 1 (B) 2 (C) 4 (D) 6

(vii) Find the smallest number by which the number 108 must be multiplied to obtain a perfect cube

(A) 2 (B) 3 (C) 4 (D) 5

(viii) Find the smallest number by which the number 88 must be divided to obtain a perfect cube

(A) 11 (B) 5 (C) 7 (D) 9

(ix) The volume of a cube is 64 cm3 . The side of the cube is

(A) 4 cm (B) 8 cm (C) 16 cm (D) 6 cm

(x) Which of the following is false?

(A) Cube of any odd number is odd.

(B) A perfect cube does not end with two zeros.

(C) The cube of a single digit number may be a single digit number.

(D) There is no perfect cube which ends with 8.