



MATHS

BOOKS - PEARSON IIT JEE

FOUNDATION

SQUARES AND SQUARE ROOTS AND CUBES AND CUBE ROOTS

Example

1. Find the value of 10001^2



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2. Find the value of 9999^2



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3. Find $(102)^2$



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4. Find $\left(49\frac{1}{2}\right)^2$



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5. Find the number of three digit perfect squares which has a non zero perfect square unit digit



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6. X and Y are single digit natural number satisfying $X^2 + Y^3 = 793$ find X+Y



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7. Find the square root of 64 using the method of successive subtraction



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8. (a) Find the value of $\frac{\sqrt{324}}{\sqrt{1225}}$ (b) Find the value of $\sqrt{4\frac{37}{81}}$ (c) Find the value of $\sqrt{0.0256}$ (d) Find the value of $\sqrt{52.2729}$



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9. (a) Find the square root of 1.5129

(b) Find the square root of 0.00484



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10. Find the square root of $12\frac{4}{7}$ and correct it to three places of decimal



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11. Examine if (a) 192 (b) 77444 are perfect cubes



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12. Examine if 1512 is a perfect cube .If not find the smallest number by which it must be multiplied so that the product is a perfect cube .Also find the smallest number by which it must be divided so that the quotient is a perfect cube.





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13. Write the digit in the units place for the cube of each of the following number

(a) 121 (b) 25 (c) 89 (d) 52

(e) 58 (f) 33 (g) 67



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14. Find 23^3 using alternative method



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15. Find 989^3 using alternative method



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16. Find the cube root of 343 using the method of successive subtraction



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17. Examine if 130 is a perfect cube .If not then find the smallest number that must be

subtracted from 130 to obtain a perfect cube



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18. When 4817 is divided by a certain positive number the quotient is $\frac{4}{3}$ times the divisor and the remainder is 17 Find the number



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19. Find the cube roots of the following number by finding their units and tens digits.

1) 512

2) 9261



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20. Find the cube root of the following using prime factorisation method

(a) 373248 (b) 27000 (c) 17576



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21. Find the value of $\sqrt{1^3 + 2^3 + 3^3 + \dots + 10^3}$



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22. If $3\sqrt{x} + \frac{48}{3\sqrt{x}} = 16$ which of the following can be the value of x ?

A. 6

B. 8

C. 12

D. none of these

Answer: N/A





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Very Short Answer Type Question

1. When a number is multiplied by itself the product is said to be _____ of the number



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2. The number of zeroes at the end of the square of a number is _____ the number of zeroes at the end of the number



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3. When a n 'n' digit number is squared then the number of digit in the square thus obtained is _____.



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4. If $7^2 = 49$ and $0.7^2 = 0.49$ then 0.07^2
= _____



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5. The smallest number with which 16 should be multiplied to make it a perfect cube is



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6. The cube root of 125 is _____



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7. The square of a proper fraction is always _____ than itself

A. Less

B. Greater

C. Both

D. None

Answer: A



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8. The square of an odd number is always odd

.Is the given statement true?

A. No

B. Yes

C. Both

D. None

Answer: B



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9. The square of a prime number is always prime is the give statement ture?



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10. The square root of a 4 digit or a 3 digit (perfect square) number is a _____ digit number



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11. If the units digit of a number is 2 then it does not have a square root .Is the given statement true?



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12. If the units digit of a perfect square is 5 then the units digit of its square root is



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13. The square root of a prime number can be obtained approximately but not exactly. Is the given statement true?



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14. If x is a non zero number then $x \times x \times x$ written as _____ is called the _____ of x



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15. A number n is a perfect cube only if there is an integer m such that $n = \underline{\hspace{2cm}}$



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16. The smallest number by which 81 should be divided to make it a perfect cube is $\underline{\hspace{2cm}}$



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17. The cubes of the digits 1,4,5,6 and 9 are the number ending in the same digits 1,4,5,6 and 9 respectively (True/False).



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18. Cubes of the numbers for which the digits in the units place are 2,8 and 3,7 end s in _____ and respectively.



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19. If a number ends in two 9's then its cube ends in _____ number of 9's.



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20. What is the digit in the units place of the cube of 31?



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21. Number of digits in the cube of a two digit number may be _____



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22. cube root of a perfect even cube is _____ and the perfect odd cube is _____



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23. The cube root of $\frac{27}{8}$ is _____



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24. $\sqrt[3]{\frac{3.43}{10}} =$ _____



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25. $\sqrt[3]{a^6 \times b^9} =$ _____



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26. The cube root of (-125) is _____



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27. 216 is the cube of _____



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28. If m is a cube root of n we write m
= _____



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$$29. 3\sqrt{0.125} + 3\sqrt{0.729} = \text{-----}$$



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$$30. \sqrt{-m^6} = \text{-----}$$



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Short Answer Type Question

1. Find the squares of the following number using the column method .Verify your resultl by finding th square using the usual method

A. 26

B. 33

C. 45

D. 84

Answer: (a)679 (b)1089 (c)2025 (d)7056 (e)9404



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2. Given reason describe why the following number are not perfect squares

A. 1058

B. 7923

C. 134387

D. 253222

Answer: N/A



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3. If the area of a square is 81 cm^2 then the measure of its side is _____



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4. Find the square of the following number

using the identify $(a + b)^2 = a^2 + 2ab + b^2$

A. 208

B. 512

C. 635

D. n/a

Answer: (a)4326 (b)262144 (c)403255



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

A. 196

B. 144

C. 121

D. 81

Answer: (a) 14 (b)12 (c)11 (d)9



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6. Find the square roots of the following using division method

A. 390625

B. 4489

C. 3249

D. 529

Answer: (a)625 (b)67 (c)57 (d)23



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7. Find the cubes of the following using alternative method

A. 52

B. 24

C. 46

D. 72

Answer: (a)140608 (b)13824 (c)97336 (d)35937



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8. Show that the following are not perfect cubes

A. 54

B. 648

C. 2058

D. 72

Answer: none of them is a perfect cube



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9. Find the cube roots of the following by finding the digits in the units and tens places

A. 110592

B. 32768

C. 2744

D. n/a

Answer: (a)48 (b)32 (c)14



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10. Find the smallest number which must be subtracted from the following to make them perfect cubes .What are the corresponding cube roots?

A. 350

B. 833

C. 1400

D. 1730

Answer: (a) 7(b)104 (c)69 (d)104



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11. Find the cube roots of the following using prime factorisation method

A. 5832

B. 19683

C. 9261

D. 405224

Answer: (a)18 (b)27 (c)21 (d)74



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12. Find the cube roots of the following numbers by successive subtraction of numbers: 1, 7, 19, 37, 61, 91, 127, 169, 217, 271, 331, 397, 64 (ii) 512 (iii) 1728

A. 125

B. 343

C. 2197

D. n/a

Answer: (a)5 (b)7 (c)13 13



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13. Mark true (T) or false (f) for the following statements

A. if n a multiple of 2 then n^3 is also multiple of 2

B. if n is not a multiple of 2 then n^3 is also not a multiple of 2

C. If n ends in 3 then n^3 ends in 7

D. A perfect cube can end with even numbr of zeroes

Answer: (a) T (b) T (c) T (d) f (e) T



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14. Find the cube roots of

A. -343

B. -4913

C. 10648

D. n/a

Answer: (a)-7 (b)-17 (c)-22



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15. When twice a non zero positive number is divided by its cube root the quotient is obtained as 32 .If the cube of the number is divided by the number itself then the quotient is _____

A. n/a

B. n/a

C. n/a

D. n/a

Answer: 4^6



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Easy Type Question

1. There is certain number of rows of chairs in a room .The number of chairs in each row is thrice the total number of rows. Find the number of chairs in each row and number of rows in the room if the total number of chairs is 2187



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2. Find the divisor and the quotient given the dividend is 1035 the divisor is one fourth the quotient and the remainder is 11



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3. In a five digit number $1b6a3$ a is the greatest single digit perfect cube and twice of it exceeds b by 7. Then the sum of the number and its cube root is _____



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4.

If

$$3\sqrt{3\sqrt{x - \frac{1}{3\sqrt{x}}} = 2, \text{ then } 3\sqrt{x} + \left(\frac{1}{3\sqrt{x}}\right)$$

= _____



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5. Find the value of $3\sqrt{288} \times 3\sqrt{432} \times 3\sqrt{648}$



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1. The least 4 digit number which is a perfect square is

A. 1024

B. 1016

C. 1036

D. 1044

Answer: a



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2. An odd number when multiplied by itself gives 2401 find the number

A. 41

B. 39

C. 49

D. 51

Answer: c



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3. If the units digits of a perfect square is 4 then the units digit of its square root can be

A. only 2

B. only 8

C. Either a or b

D. Neither a nor b

Answer: C



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4. What will be the units digit of the squares of the following numbers?

A. 71

B. 669

C. 2533

D. 30827

Answer: c



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5. Which of the following is not a perfect square ?

A. 12544

B. 3136

C. 23832

D. 1296

Answer: c



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6. The smallest number with which 120 should be multiplied so that the product is a perfect square is

A. 120

B. 60

C. 30

D. 15

Answer: c



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7. The greatest 3 digit number which is a perfect square is

A. 729

B. 927

C. 961

D. 972

Answer: C



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8. If p and q are perfect squares then $\frac{\sqrt{p}}{q}$ is always a rational number. Is the statement true?

A. yes

B. no

C. cannot be determined

D. none of these

Answer: a



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9. $\sqrt[3]{\frac{-a^6 \times b^3 \times c^{21}}{c^9 \times a^{12}}} = \dots\dots\dots$

A. $\frac{-bc^3}{a^2}$

B. $\frac{bc^4}{a^2}$

C. $\frac{-ab^4}{c^2}$

D. $\frac{-bc^4}{a^2}$

Answer: d



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10. If $3(x - 2)^2 = 507$ then x can be

A. 13

B. 12

C. 15

D. 14

Answer: C



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11. The value of $\sqrt{117^2 - 108^2}$

A. 55

B. 45

C. 35

D. 65

Answer: b



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12. The square root of $\frac{36}{5}$ when corrected to two decimal places is

A. 2.68

B. 2.69

C. 2.67

D. 2.66

Answer: A



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13. If the product of two equal numbers is 1444 then the numbers are

A. 48,48

B. 38,38

C. 32,32

D. 42,42

Answer: b



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14. The cube of the number p is 16 times the number. Then find p where $p \neq 0$

A. 4

B. 3

C. 8

D. 2

Answer: a



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15. The cube of a number x is nine times of x
then find $x \neq 0$ and $x \neq -3$

A. 8

B. 2

C. 4

D. 3

Answer: d



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16. The digit in the units place for the cube of a four digit number of the form $xyz8$

A. 8

B. 4

C. 2

D. 3

Answer: c



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17. The digit in the units place for the cube of the number 12345678 is _____

A. 8

B. 2

C. 4

D. 6

Answer: b



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18. Which of the following number becomes a perfect cube when we divide the number by 5?

A. 25

B. 125

C. 325

D. 3125

Answer: c



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19. The least number to be subtracted from 220 so that it become a perfect cube is

A. 4

B. 10

C. 16

D. 20

Answer: a



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20. If $(x^y)^z = 2^8$ then find the maximum possible value of $(x)(y)(z)$ where $x, y, z > 0$

A. 16

B. 12

C. 256

D. 24

Answer: C



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21. The smallest number which must be subtracted from 3400 to make it a perfect cube is _____

A. 35

B. 25

C. 65

D. 15

Answer: b



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22. If $a = 2b$ and $b = 4c$ then $\left(\frac{a^{\frac{1}{4}}}{16bc}\right)^{\frac{1}{2}} =$

A. 1

B. 2

C. 3

D. 4

Answer: A



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23. निम्न में से कौन सा पूर्ण वर्ग है?

A. 16384

B. 23857

C. 18496

D. 11025

Answer: b



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24. The least number which must be added to 1200 so that the sum is a perfect square is

A. 52

B. 25

C. 35

D. 45

Answer: b



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25. The cube root of 110592 is _____

A. 44

B. 38

C. 58

D. 48

Answer: d



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26.
$$\sqrt[3]{\frac{3^6 \times 4^3 \times 2^6}{8^9 \times 2^3}} = \text{_____}$$

A. $\frac{3}{8}$

B. $\frac{9}{8}$

C. $\frac{3}{64}$

D. $\frac{9}{64}$

Answer: d



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27. If n is a perfect cube then every prime factor of ' n ' occurs _____

A. one times

B. two times

C. 3 times

D. 4 times

Answer: c



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28. The cube root of the number 10648 is

A. 42

B. 38

C. 28

D. 22

Answer: d



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29. The cube of a number ending in 3 ends in

A. 3

B. 7

C. 9

D. cannot say

Answer: b



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30. If n leaves a remainder 1 when divided by 2

then n^3 leaves a remainder of

_____ when divided by 2

A. 1

B. 2

C. 0

D. 3

Answer: a



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31. If $169 = b^2 + 25$ then find the value of b . The following sentences are the steps involved in

solving the above problem .Arrange them in sequential order from the first to the last

A. BAC

B. BCA

C. CAB

D. ACB

Answer: a



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32. Area of square plot is 6561 m^2 find the length of a diagonal of the square plot . The following are the steps involved in solving the above problem Arrange them in sequential order

(A) Area of the square plot =

$$\sqrt{2} \times x = 81\sqrt{2}m$$

(B) Length of the diagonal =

$$\sqrt{2} \times x = 81\sqrt{2}m$$

(C) Let the side of the square plot be $x \text{ cm}$

(D) \therefore side of the square plot $x =$

$$\sqrt{6561} = 81m$$

A. DCBA

B. BCAD

C. CADB

D. ABDC

Answer: c



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33. The length of a diagonal of a square plot is 24 cm find the area of the square plot.

The following are the steps involed in solving

the above problem .arrange them in sequential order

(A) Area of the square plot =
$$\frac{1}{2} \times (24)^2 = 288cm^2$$

(B) Given that hte length of diagonal of a square plot (d)=24 cm

(C) Are of a square when diagonal is given is
$$\frac{1}{2}d^2$$

A. CAB

B. BCA

C. ABC

D. BAC

Answer: b



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34. Find the smallest number by which 2592 should be divided so that the quotient is a perfect cube. The following are the steps involved in solving the above problem. Arrange them in sequential order.

(A) On prime factorisation $2592 = 2^5 \times 3^4$

(B) 2592 should be divided by 12 so that the quotient is a perfect cube

(C) Now $2592 = (6)^3 \times 12$

A. ACB

B. ABC

C. CAB

D. CBA

Answer: a



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35. Find the smallest number by which 5400 should be multiplied so that the product is a perfect cube. The following are the steps involved in solving the above problem. Arrange them in sequential order (A)

→ $5400 = 2^3 \times 3^3 \times 5^2$ (B) on prime factorisation of 5400 we get $5400 =$

$2 \times 2 \times 2 \times 5 \times 5 \times 3 \times 3 \times 3$ (C) ∴ 5400

must be multiplied by 5 so that the product is a perfect cube (D) In the prime factorisation of

5400 we observe that 5 has not appeared n times where n is a multiple of 3

A. BACD

B. BADC

C. BDAC

D. ABDC

Answer: b



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Level 2

1. The square root of 102 up to three places of decimals is

A. 10.098

B. 10.099

C. 10.097

D. 10.096

Answer: b



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2. A number is multiplied by half of itself and then 32 is added to the product .If the final result is 130 then find the original number

A. 4

B. 7

C. 5

D. 14

Answer: d



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3. A man purchased a plot which is in the shape of a square .The area of the plot is 12 hectares $3201 m^2$.Find the length of each side of the plot (in m)

A. 349

B. 351

C. 359

D. 361

Answer: b



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4. A certain number of men went to a hotel .Each man spent as many rupee as one fourth of the men.If the total bill paid was Rs 20449 then how many men visited the hotel?

A. 286

B. 284

C. 281

D. 283

Answer: a



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5. Find the divisor given that the dividend is 2200 remainder is 13 the divisor is one third of the quotient

A. 25

B. 27

C. 24

D. none of these

Answer: b



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6. The least positive integer with which 661.25 should be multiplied so that the product is a perfect square is _____

A. 4

B. 5

C. both a and b

D. none of these

Answer: b



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7. A number is multiplied by $2\frac{1}{3}$ times itself and then 61 is subtracted from the product obtained .If the final result is 9200 then the number is

A. 36

B. 63

C. 67

D. 37

Answer: b



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8. The units digit of the square of a number and the units digits of the cube of the number are equal to the units digits of the number .How many values are possibles for the units digits of such number?

A. 2

B. 4

C. 5

D. 3

Answer: b



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9. what should be added to 2714 to make the sum a perfect cube?

A. 10

B. 517

C. 30

D. 150

Answer: C



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10. When 616 is divided by a certain positive number which is $66\frac{2}{23}\%$ of the quotient it leaven 16 as the remainder .Find the divisor

A. 20

B. 30

C. 24

D. 15

Answer: a



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11. If a and b are whole number such that

$a^b = 512$ where $a > b$ and $1 < b < 4$ then

$b\sqrt{a} =$

A. 2

B. 3

C. 4

D. cannot be determined

Answer: a



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12. Find the value of

$$3\sqrt[3]{6075} \times 3\sqrt[3]{88935} \times 3\sqrt[3]{9625}$$

A. 17355

B. 17255

C. 17315

D. 17325

Answer: d



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13. The sides of \triangle are denoted by x , y and z .

Area of the \triangle and semiperimeter of the \triangle

are denoted by P and q respectively. If $P = \sqrt{q}$

$(q-x)(q-y)(q-z)$ and $x+y-z=y+z-x=z+x-y=4$ Find P

(in square units)

A. $2\sqrt{3}$

B. $3\sqrt{3}$

C. $4\sqrt{3}$

D. $6\sqrt{3}$

Answer: c



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14. The units digit of the square of a number and the units digits of the cube of the number are equal to the units digits of the number .How many values are possibles for the units digits of such number?

A. 2

B. 3

C. 4

D. 5

Answer: c



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15. Find the smallest positive integer that should be added to 3369 so that sum is perfect cube

A. 5

B. 4

C. 6

D. 7

Answer: c



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16. $\sqrt[3]{1 + 3 + 5 + 7 + \dots + 53} = \text{-----}$

A. 11

B. 13

C. 7

D. 9

Answer: D



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17. What is the least positive integer that should be subtracted from 2750 so that the difference is a perfect cube?

A. 15

B. 14

C. 9

D. 6

Answer: d



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18. If $\sqrt{x} + \frac{58}{\sqrt{x}} = 31$ then which of the following can be the value of x?

A. 9

B. 1

C. 2

D. 4

Answer: d



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1. In an Atlas, a map occupies $\frac{1}{5}$ th of a page with dimensions 25cm and 30cm respectively. If the real area of the map is 194400m^2 , the scale to which the map is drawn, is

A. $1\text{cm} = 36\text{x}$

B. $1\text{ cm} = 26\text{ m}$

C. $1\text{ cm} = 33\text{ m}$

D. $1\text{ cm} = 23\text{ m}$

Answer: a



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2. The volume of a spherical ball is given by the formula $V = \frac{4}{3}\pi r^3$ where V is the volume and r is the radius. Find the diameter of the sphere whose volume is $\frac{117128}{21} \text{ m}^3$

A. 22m

B. 11m

C. 33m

D. 44m

Answer: a



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3. If a is any natural number then $a^3 - \frac{1}{a^3}$ will always be greater than or equal to

A. $3a + \frac{1}{a}$

B. $\frac{a + 1}{a}$

C. $a^3 + \frac{1}{a^3}$

D. $\frac{3(a - 1)}{a}$

Answer: d



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4. In a four digit number $5a3b$ $a > b$ and $a = b^3$. Then the difference of the number and its cube root is

A. 5850

B. 5220

C. 5256

D. 5814

Answer: d



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5. In a school there are as many children in each room as thrice the number of rooms in the school for the charity each child contributed an average amount of Rs $5\frac{1}{3}$ If the total money contributed was Rs 25600

then find the number of children in each room
then find number of children in each room of
the school.

A. 40

B. 80

C. 120

D. 100

Answer: c



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6. Find how many three digit perfect cubes is there whose sum of the digits is a perfect square

A. 1

B. 2

C. 3

D. 4

Answer: a



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7. If x and y whole number such that $y = 19683$ and $y > x$ and $1 < x < 4$ then $x\sqrt{y}$ is _____

A. 13

B. 17

C. 3

D. 9

Answer: c



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