FOUNDATION (V_2)

Class: VII . MATHEMATICS

2. SQUARE, SQURE ROOTS AND CUBE AND CUBE ROOTS

TEACHING TASK (JEE MAINS)

01. $(25)^2 = 625$ — Ans: C

02 $\sqrt{998001} = 999$, three digits — Ans: 3

↳ Formula; If a digit contains n digits, then its square root contains $\frac{n}{2}$ digits if n is even and $\frac{n+1}{2}$, if n is odd.

Here 998001 contains 6 digits, which is even.

∴ No. of digits in its square root $= \frac{6}{2} = 3$ digits

03 A) $9^3 = 729$ B) $(10)^3 = 1000$ C) $(16)^3 = 4096$ Ans: D

04 B) $(9)^2 = 81$ — Ans: B

05 C) $(49)^2 = 2401$ — Ans: C

06 $(-6)^3 = -216$ — Ans: B

07 $\sqrt[3]{1+3+5+7+\cdots+53}$

$= \sqrt[3]{(27)^2}$

$= (27)^{\frac{2}{3}} = (3^3)^{\frac{2}{3}} = 9$

1, 3, 5, 7 ... 53 → A.P

$53 = a+(n-1)d$

$53 = 1+(n-1)\cdot 2$

$n = 27$ Ans-D

08 $\sqrt[3]{512} = 8$ Ans: B

09 $\sqrt[3]{5832} = 18$ Ans: A

10 36 Ans: B

11 A) $\sqrt{105} = 10.247$ B) $\sqrt{196} = 14$

C) $\sqrt{289} = 17$ D) $\sqrt{361} = 19$

clearly All the values lie between 10 and 20

Ans: A, B, C, D

12 A) $\sqrt[3]{-125} = \sqrt[3]{(-5)^3} = -5$ ✓

B) $\sqrt[3]{512} = \sqrt[3]{(8)^3} = 8$ ✓

C) $\sqrt[3]{729} = \sqrt[3]{(9)^3} = 9$ ✓

D) $\sqrt[3]{81} \neq \sqrt[3]{(3)^3} = \neq 3$

Ans: A, B, C

13 Statement I: Conceptual (false)

Statement II: Conceptual (True) Ans: D

14 Statement I: Conceptual (~~False~~ True) since $4^3 = 64$

Statement II: Conceptual (True) Ans: A

15. Assertion (A):

We have $176 = 2^4 \times 11$.

$\therefore$ 176 is not a perfect square (True)

Reason: Conceptual (True)

Ans. A

2 | 176
2 | 88
2 | 44
2 | 22
11

16. Assertion: Conceptual (True)

Reason: Conceptual (True)

Ans. A

17. 180 is not a perfect square

Ans. D

18. $169 = 13^2$

Ans. A

19. $\sqrt{144} = 12$

Ans. A

20. Conceptual (A)

Ans. A

21. We know, $72 = 2^3 \times 3^2$

To make it, perfect square, we need one more 2.

$\therefore 72 \times 2 = 2^3 \times 3^2 \times 2 = 2^4 \times 3^2 = (2^2 \times 3)^2$

$\therefore$ least value of $x = 2$

Ans. A

22. $\therefore 72 \times 2 = 144$.

$\therefore 144 = 12^2$

Ans. B

23. clearly $24^2 = 576$

$\therefore n^2 = 576$

$\Rightarrow n = 24$

Ans: 24

24 Two digit perfect cubes are, 27, 64.

Since $3^3 = 27$, $4^3 = 64$.

Sum = $27 + 64 = 91$

Ans: 91

25 a) $15^2 = 225$ (P)

b) $\sqrt[3]{1728} = 12$ (q)

c) $13^2 = 169$ (r)

d) $6^3 = 216$ (s)

Ans: P, q, r, S

26 a) $1^2 = 1$, $9^2 = 81$ (P)

b) $\sqrt{50} = 7.09$ $\therefore$

$\therefore 7 < \sqrt{50} < 8$ (S)

c) Conceptual (r)

d) $\sqrt{625} = 25$ (q)

Ans: P, S, r, q

LEARNERS TASK (CUL'S)

01. c) A perfect square always ends with 0, 1, 4, 5, 6 or 9.

~~Ans: C~~

d) A perfect square has odd number of total factors

Ans: A, D

02 Conceptual (c)

ex: a) 36 (2 digits) | b) 4900 (4 digits)

$\sqrt{36} = 6$ (1 digit) | $\sqrt{4900} = 70$ (2 digits)

c) 129,961 (6 digits)

$\sqrt{129961} = 360$ (3 digits)

Ans: C

03 Conceptual

Ans: B

04 Conceptual

Ans: B

05 25

Ans: B

06. ~~$32 \times 2 = 64 =$~~

$\therefore 32 = 2^5$

∴ least number to be multiplied is 2

2 | 32
2 | 16
2 | 8
2 | 4
2

Ans: C

07. $\sqrt{\text{prime number}}$ = Irrational no.

Ans: C

08 Conceptual

Ans: A

09. $\sqrt[3]{2} \times \sqrt[3]{3} \times \sqrt[3]{36}$

$= \sqrt[3]{2 \times 3 \times 36} = \sqrt[3]{6^3} = 6$

Ans: B

10. Conceptual

Ans: A

JEE MAINS LEVEL

01. 7 — Ans: B

02. $(\underline{\quad 3})^3 = \underline{\quad\quad 7}$ — Ans: A

03. perfect squares just below and just above 180 — Ans: B

04 Conceptual — Ans: A

05 Conceptual — Ans: C

06 $64 = 4^3$, $125 = 5^3$ — Ans: D

07. $\sqrt[3]{-1000} = \sqrt[3]{(-10)^3} = -10$ — Ans: C

08 $\sqrt[3]{9261} = \sqrt[3]{(21)^3} = 21$ — Ans: A

09. $\sqrt{0.0009} = \sqrt{(0.03)^2} = 0.03$ — Ans: A

10 $(1003)^3 = \underline{\quad\quad 3^3} = \underline{\quad\quad 7}$

Similarly for 2433, 3783 — Ans: D

JEE ADVANCED

11. A) $64 = 4^3$ ✓ B) $250 \neq (\quad)^3$

C) $343 = (7)^3$ ✓ D) $729 = (9)^3$ — Ans: A, C, D

12 Conceptual — Ans: A, D

13 Statement I: Conceptual (True)

Statement II: $\sqrt[3]{-343} = -7$ (True) — Ans: A

14. Statement I: Conceptual (True)
Statement II: Conceptual (True)
Ans: A

15 Assertion: Conceptual (True)
Reason: Conceptual (True)
Ans: A

16 Assertion:
$\therefore 1225 = 5^2 \times 7^2 = (35)^2$
$\therefore \sqrt{1225} = 35$ (True)

Reason: Conceptual (True)

5 | 1225
5 | 245
7 | 49
7

Ans: A

17 $1 + 3 + 5 + \cdots + 99$.
1, 3, 5, .. are in A.P
$\therefore 99 = a + (n-1)d$
$\Rightarrow 99 = 1 + (n-1) \cdot 2$
$\Rightarrow n = 50$
$\therefore 1 + 3 + 5 + \cdots + 99 = (50)^2 = 2500$ Ans: C

18 $3 + 9 + 15 + 21 + \cdots + 63$
3, 9, 15, 21, .. are in A.P.
$63 = a + (n-1)d$
$\Rightarrow 63 = 3 + (n-1)6$
$\Rightarrow n = 11$
$\therefore 3 + 9 + 15 + \cdots + 63 = \frac{n}{2}(a + l)$
$= \frac{11}{2}(3 + 63) = 363$
Ans: A

19. $2+4+6+\cdots+400$

$= 2(1+2+3+\cdots+200)$

$= 2 \times \frac{n(n+1)}{2} = 2 \times \frac{200 \times 201}{2} = 40200$

Ans: D

20 option verification: (A) 45

$4+5=9$ ✓

$45+9=54$ ✓

Ans: A

21 $(45)^2 = 2025$

Ans: A

22 45 is neither perfect square nor perfect cube

Ans: D

23 1000, since $10^3 = 1000$

Ans: 10

24 64, since $4^3 = 64$

Ans: 4

25 a) $24^2 = 576$ (P) b) $\sqrt[3]{512} = 8$ (q)

c) $\sqrt{2025} = 45$ (r) d) $4^3 = 64$ (s)

Ans: P, q, r, s

26 a) $\sqrt[3]{27} = 3$ (s)

b) $\sqrt[3]{64} = 4$ (p)

c) $\sqrt[3]{8} = 2$ (r)

d) $\sqrt[3]{125} = 5$ (q)

Ans: s, q, r, p

$\Longrightarrow$ THE END $\in$