Chapter : 4. CUBES AND CUBE ROOTS

Exercise : 4A

Question: 1

Evaluate:

Solution:

(i) To calculate the cube of $(8)^3$

We have to multiply the given number three times;

= (8 × 8 × 8) = 512

So, 512 is the cube of 8.

(ii) $(15)^3$

First multiply the given number three times;

= (15 × 15 ×15) = 3375

So, 3375 is the cube of 15

(iii) $(21)^3$

First multiply the given number three times;

= (21 × 21 × 21) = 9261

9261 is the cube of 21.

(iv) $(60)^3$

First multiply the given number three times;

= (60 × 60 × 60) = 216000

216000 is the cube of 60.

Question: 2

Evaluate:

Solution:

(i) To calculate the cube of $(1.2)^3$

We have to multiply the given number three times;

= (1.2 × 1.2 × 1.2) = 1.728

Now by converting it into fraction we get,

$= \dfrac{1728}{1000}$

$= \dfrac{216}{125}$

(ii) To calculate the cube of $(3.5)^3$

We have to multiply the given three times;

= (3.5 × 3.5 × 3.5) = 42.875

Now by converting it into fraction we get,

$= \dfrac{42875}{1000}$

$= \frac{343}{8}$

(iii) To calculate the cube of $(0.8)^3$

We have to multiply the given number by its power;

$= (0.8 \times 0.8 \times 0.8) = 0.512$

Now by converting it into fraction we get,

$= \frac{512}{1000}$

$= \frac{64}{125}$

(iv) To calculate the cube of $(0.05)^3$

We have to multiply the given number by its power;

$= (0.05 \times 0.05 \times 0.05) = 0.000125$

Now by converting it into fraction we get,

$= \frac{125}{1000000}$

$= \frac{1}{8000}$

Question: 3

Evaluate:

Solution:

(i) $\left(\frac{4}{7}\right)^3$

By multiplying we get,

$= \left(\frac{4}{7} \times \frac{4}{7} \times \frac{4}{7}\right)$

$= \left(\frac{64}{343}\right)$

So, cube of $\frac{4}{7}$ is $\left(\frac{64}{343}\right)$

(ii) $\left(\frac{10}{11}\right)^3$

Multiplying the given number three times we get,

$= \left(\frac{10}{11} \times \frac{10}{11} \times \frac{10}{11}\right)$

$= \left(\frac{1000}{1331}\right)$

(iii) $\left(\frac{1}{15}\right)^3$

Multiplying the given number three times we get,

$= \left(\frac{1}{15} \times \frac{1}{15} \times \frac{1}{15}\right)$

$= \left(\frac{1}{3375}\right)$

(iv) $\left(1\frac{3}{10}\right)^3$

Multiplying the given number three times we get,

$$= \left(\frac{13}{10}\right)^3$$

$$= \left(\frac{13}{10} \times \frac{13}{10} \times \frac{13}{10}\right)$$

$$= \left(\frac{2197}{1000}\right)$$

Question: 4

Which of the foll

Solution:

(i) 125

First find out the prime factors of 125,

5	125
5	25
5	5
	1

125 = 5×5×5

As we see a group of three 5 is made, which we can also be write as 5^3;

So, 125 is the product of triplets of 5.

Therefore, it is the perfect cube.

(ii) 243

The prime factorization of 256 is shown below:

```
3 | 243
  +-------
3 | 81
  +-------
3 | 27
  +-------
3 | 9
  +-------
3 | 3
  +-------
  | 1
```

243 = 3 × 3 × 3 × 3 × 3

To be a perfect cube the prime factors of number should make a group of 3 but as we can see here more than 3 numbers are available in prime factors.

So, 243 is not the perfect cube.

(iii) 343

The prime factorization of 256 is shown below:

```
7 | 343
  +-------
7 | 49
  +-------
7 | 7
  +-------
  | 1
```

343 = 7 × 7 × 7

As we see a group of three 7 is formed, which we can also be write as 7^3;

So, 343 is the product of triplets of 7.

Therefore, it is the perfect cube.

(iv) 256

The prime factorization of 256 is shown below:

2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

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

If the prime factors are not making the pairs of three so the number is not perfect cube.

(v) 8000

The prime factorization of 8000 is shown below:

2	8000
2	4000
2	2000
2	1000
2	500
2	250
5	125
5	25
5	5
	1

8000 = 2×2×2×2×2×2×5×5×5

As we can see three pairs can be made of the above prime factors, which are 2^3, 2^3, and 5^3.

So, 8000 can be expressed as the product of the triplets of 2, 2 and 5, i.e.

$2^3 \times 2^3 \times 5^3 = 20^3$

Therefore, 8000 is a perfect cube.

(vi) 9261

The prime factorization of 9261 is shown below:

3	9261
3	3087
3	1029
7	343
7	49
7	7
	1

9261 = 3×3×3×7×7×7

As we can see two pairs can be made of the above prime factors, which are 3^3, and 7^3.

So, 9261 can be expressed as the product of the triplets of 3 and 7, i.e.

$3^3 \times 7^3 = 21^3$

Therefore, 9261 is a perfect cube.

(vii) 5324

The prime factorization of 5324 is shown below:

2	5324
2	2662
11	1331
11	121
11	11
	1

5324 = 2×2×11×11×11

Therefore, 5324 is not a perfect cube.

(viii) 3375

The prime factorization of 3375 is shown below:

3	3375
3	1125
3	375
5	125
5	25
5	5
	1

3375 = 3×3×3×5×5×5

As we can see two pairs can be made of the above prime factors, which are 3^3, and 5^3.

So, 3375 can be expressed as the product of the triplets of 3 and 5, i.e.

$3^3 \times 5^3 = 15^3$

Therefore, 3375 is a perfect cube.

Question: 5

Which of the foll

Solution:

By the rule for even numbers, the cubes of even numbers are always even.

So, first we have to look for which given numbers are even.

216, 512 and 1000 are the even numbers.

Now, the prime factorization are as follows:

2	216
2	108
2	54
3	27
3	9
3	3
	1

∴ 216 = 2×2×2×3×3×3 = $2^3 \times 3^3 = 6^3$

2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

∴ 512 = 2×2×2×2×2×2×2×2×2 = $2^3 \times 2^3 \times 2^3 = 8^3$

2	1000
2	500
2	250
5	125
5	25
5	5
	1

$\therefore$ 1000 = 2×2×2×5×5×5 = $2^3 \times 5^3 = 10^3$

Therefore, we can say that 216, 512 and 1000 are the cube of even numbers.

Question: 6

Which of the foll

Solution:

By the rule for odd numbers, the cubes of odd numbers are always odd.

So, first we have to look for which of the given numbers are odd.

125, 343 and 9261 are the odd numbers.

5	125
5	25
5	5
	1

$\therefore$ 125 = 5×5×5 = 5^3

```
7 | 343
  _____
7 | 49
  _____
7 | 7
  _____
    1
```

∴ 343 = 7×7×7 = 7^3

```
3 | 9261
  _____
3 | 3087
  _____
3 | 1029
  _____
7 | 343
  _____
7 | 49
  _____
7 | 7
  _____
    1
```

∴ 9261 = 3×3×3×7×7×7 = 3^3 × 7^3 = 21^3

As we can see, odd numbers are the cubes of odd number.

Therefore, 125, 343 and 9261 are the cubes of odd numbers.

Question: 7

Find the smallest

Solution:

Let's find out the prime factors of the given number,

3	1323
3	441
3	147
7	49
7	7
	1

$1323 = 3 \times 3 \times 3 \times 7 \times 7$

As we can see, one 7 is required to make the pair of two triplets. So, 7 will be the smallest number to multiply 1323 to make it the perfect cube.

Question: 8

Find the smallest

Solution:

Let's find out the prime factors of the given number,

2	2560
2	1280
2	640
2	320
2	160
2	80
2	40
2	20
2	10
5	5
	1

$\therefore$ 2560 = 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 5

As we can see, to make the pair of 4 triplets two 5 are required, which is 5×5.

So, 25 will be the number multiplied to 2560, to get the perfect cube.

Question: 9

What is the small

Solution:

Let's find out the prime factors of the given number,

2	1600
2	800
2	400
2	200
2	100
2	50
5	25
5	5
	1

1600 = 2 × 2 × 2 × 2 × 2 × 2 × 5 × 5

So, in these two pairs of 2 triplets, two 5 are extra. Therefore to get the perfect cube we have to divide the given number by 5×5, which is 25.

Question: 10

Find the smallest

Solution:

Let's find out the prime factors of the given number,

2	8788
2	4394
13	2197
13	169
13	13
	1

$8788 = 2 \times 2 \times 13 \times 13 \times 13$

So, in this pair of triplets, two 2 are extra. Therefore to get the perfect cube we have to divide the given number by 2×2, which is 4.

Exercise : 4B

Question: 1

Find the value of

Solution:

Let's take, a = 2 and b = 5

So, by using the formula,

We have $a^3+3a^2b+3ab^2+b^3$

4	4	25	25
× 2	× 15	× 6	× 5
8	60	150	**125**
+7	+16	+12	
15	**76**	**162**	

Keep the digits

By taking the highlighted digits only,

We get;

$15625 = {}^3(25)$ ˎ

Question: 2

Find the value of

Solution:

Let's take, a = 4 and b = 7

So, by using the formula,

We have, $a^3 + 3a^2b + 3ab^2 + b^3$

16	16	49	49
4	× 21	× 12	× 7
64	336	588	343
+39	+62	+34	
103	398	622	

By taking the highlighted digits only,

We get;

$103823 = {}^3(47)$ ˎ

Question: 3

Find the value of

Solution:

Let's take,

a = 6 and

b = 8

So, by using the formula,

We have $a^3 + 3a^2b + 3ab^2 + b^3$

36	36	64	64
X 6	X 24	X 18	X 8
216	864	1152	512
+98	+120	+51	
314	984	1203	

By taking the highlighted digits only,

We get;

$314432 = {}^3(68)$.

Question: 4

Find the value of

Solution:

Let's take,

a = 8 and

b = 4

So, by using the formula,

We have $a^3 + 3a^2b + 3ab^2 + b^3$

64	64	16	16
X 8	X 12	X 24	X 4
512	768	384	64
+80	+39	+6	
592	807	39**0**	

By taking the highlighted digits only,

We get;

$592704 = {}^3(84).$

Exercise : 4C

Question: 1

Evaluate:

Solution:

By prime factorization method we get;

2	64
2	32
2	16
2	8
2	4
2	2
	1

$64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$

$= (2 \times 2 \times 2) \times (2 \times 2 \times 2)$

$4 = (2 \times 2) = \sqrt[3]{(2)^3 \times (2)^3}.$

Question: 2

Evaluate:

Solution:

By prime factorization method we get;

7	343
7	49
7	7
	1

343 = 7×7×7

= (7×7×7)

∴ $\sqrt[3]{343} = \sqrt[3]{7^3} = 7$

Question: 3

Evaluate:

Solution:

By prime factorization method we get;

3	729
3	243
3	81
3	27
3	9
3	3
	1

729 = 3×3×3×3×3×3

= (3×3×3) × (3×3×3)

$\therefore \sqrt[3]{729} = (3 \times 3) = 9$

Question: 4

Evaluate:

Solution:

By prime factorization method we get;

2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

$1728 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3$

$= (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (3 \times 3 \times 3)$

$= 2^3 \times 2^3 \times 3^3$

$\therefore \sqrt[3]{1728} = (2 \times 2 \times 3) = 12$

Question: 5

Evaluate:

Solution:

By prime factorization method we get;

3	9261
3	3087
3	1029
7	343
7	49
7	7
	1

9261 = 3×3×3×7×7×7

= (3×3×3) × (7×7×7)

∴ $\sqrt[3]{9261}$ = (3×7) = 21

Question: 6

Evaluate:

Solution:

By prime factorization method we get;

2	4096
2	2048
2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

4096 = 2 ×2 ×2 ×2 ×2 ×2 ×2 ×2 ×2 ×2 ×2 ×2

= (2 ×2 ×2) × (2 ×2 ×2) × (2 ×2 ×2) × (2 ×2 ×2)

= $2^3 \times 2^3 \times 2^3 \times 2^3$

∴ $\sqrt[3]{4096}$ = (2 ×2 ×2 ×2) = 16

Question: 7

Evaluate:

Solution:

By prime factorization method we get;

2	8000
2	4000
2	2000
2	1000
2	500
2	250
5	125
5	25
5	5
	1

$8000 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5$

$= (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (5 \times 5 \times 5)$

$= 2^3 \times 2^3 \times 5^3$

$\therefore \sqrt[3]{8000} = (2 \times 2 \times 5) = 20$

Question: 8

Evaluate:

Solution:

By prime factorization method we get;

5	3375
5	675
5	135
3	27
3	9
3	3
	1

3375 = 3 ×3 ×3 ×5 ×5 ×5

= (3 ×3 ×3) × (5 ×5 ×5)

∴ $\sqrt[3]{3375}$ = (3 ×5) = 15

Question: 9

Evaluate:

Solution:

By prime factorization method we get;

2	216
2	108
2	54
3	27
3	9
3	3
	1

216 = 2 ×2 ×2 ×3 ×3 ×3

= (2 ×2 ×2) × (3 ×3 ×3)

$\sqrt[3]{-216}$ = - (2 ×3) = - 6

Question: 10

Evaluate:

Solution:

By prime factorization method we get;

2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

512 = 2×2×2×2×2×2×2×2×2

= (2×2×2) × (2×2×2) × (2×2×2)

$\sqrt[3]{-512} = -\sqrt[3]{(2 \times 2 \times 2)}$ = - 8

Question: 11

Evaluate:

Solution:

By prime factorization method we get;

11	1331
11	121
11	11
	1

$1331 = 11 \times 11 \times 11 = 11^3$

$\sqrt[3]{-1331} = -\sqrt[3]{11 \times 11 \times 11} = -(11 \times 11 \times 11)^{\frac{1}{3}} = $ -11

Question: 12

Evaluate:

Solution:

By prime factorization method we get;

27;

3	27
3	9
3	3
	1

$27 = 3 \times 3 \times 3$

64;

2	64
2	32
2	16
2	8
2	4
2	2
	1

64 = 2×2×2×2×2×2

Now,

$$\sqrt[3]{\frac{27}{64}} = \frac{\sqrt[3]{27}}{\sqrt[3]{64}}$$

$$= \frac{\sqrt[3]{(3\times3\times3)}}{\sqrt[3]{(2\times2\times2)\times(2\times2\times2)}}$$

$$= \frac{\sqrt[3]{(3\times3\times3)}}{\sqrt[3]{(4\times4\times4)}} = \frac{3}{4}$$

$$\therefore \sqrt[3]{\frac{27}{64}} = \frac{3}{4}$$

Question: 13

Evaluate:

Solution:

By prime factorization method we get;

125

5	125
5	25
5	5
	1

216

2	216
2	108
2	54
3	27
3	9
3	3
	1

$$\therefore \sqrt[3]{\frac{125}{216}} = \frac{\sqrt[3]{5 \times 5 \times 5}}{\sqrt[3]{(2 \times 2 \times 2) \times (3 \times 3 \times 3)}}$$

$$= \frac{\sqrt[3]{5 \times 5 \times 5}}{\sqrt[3]{6 \times 6 \times 6}} = \frac{5}{6}$$

$$\sqrt[3]{\frac{125}{216}} = \frac{5}{6}$$

Question: 14

Evaluate:

Solution:

By prime factorization method we get;

3	27
3	9
3	3
	1

$27 = 3 \times 3 \times 3$

125

5	125
5	25
5	5
	1

$$\sqrt[3]{\frac{27}{125}} = \sqrt[3]{\frac{3 \times 3 \times 3}{5 \times 5 \times 5}}$$

$$= \sqrt[3]{\frac{-27}{125}} = \frac{-3}{5}$$

Question: 15

Evaluate:

Solution:

By prime factorization method we get;

2	64
2	32
2	16
2	8
2	4
2	2
	1

$64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$

343;

7	343
7	49
7	7
	1

$$\sqrt[3]{\frac{64}{343}} = \sqrt[3]{\frac{2 \times 2 \times 2 \times 2 \times 2 \times 2}{7 \times 7 \times 7}}$$

$$= \sqrt[3]{\frac{-64}{343}} = \frac{-4}{7}$$

Question: 16

Evaluate:

Solution:

By prime factorization method we get;

2	64
2	32
2	16
2	8
2	4
2	2
	1

$64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$

3	729
3	243
3	81
3	27
3	9
3	3
	1

$\sqrt[3]{64 \times 729} = \sqrt[3]{64} \times \sqrt[3]{729}$

$= \sqrt[3]{4 \times 4 \times 4} \times \sqrt[3]{(3 \times 3 \times 3) \times (3 \times 3 \times 3)}$

$= \sqrt[3]{4 \times 4 \times 4} \times \sqrt[3]{9 \times 9 \times 9}$

$= \sqrt[3]{64 \times 729} = (4) \times (9) = 36$

Question: 17

Evaluate:

Solution:

By prime factorization method we get;

3	729	2	1000
3	243	2	500
3	81	2	250
3	27	5	125
3	9	5	25
3	3	5	5
	1		1

$$\sqrt[3]{\frac{729}{1000}} = \frac{\sqrt[3]{(3\times3\times3)\times(3\times3\times3)}}{\sqrt[3]{(2\times2\times2)\times(5\times5\times5)}}$$

$$= \frac{\sqrt[3]{9\times9\times9}}{\sqrt[3]{10\times10\times10}}$$

$$= \sqrt[3]{\frac{729}{1000}} = \frac{9}{10}$$

Question: 18

Evaluate:

Solution:

The prime factorization of 512:

2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

The prime factorization of 343:

7	343
7	49
7	7
	1

$$\sqrt[3]{\frac{512}{343}} = \frac{\sqrt[3]{8 \times 8 \times 8}}{\sqrt[3]{7 \times 7 \times 7}}$$

$$= \sqrt[3]{\frac{-512}{343}} = \frac{-8}{7}$$

Exercise : 4D

Question: 1

Which of the foll

Solution:

The prime factorization of 141:

3	141
47	47
	1

$$= \sqrt[3]{141} = \sqrt[3]{3 \times 47}$$

The prime factorization of 294:

2	294
3	147
7	49
7	7
	1

$$= \sqrt[3]{294} = \sqrt[3]{2 \times 3 \times 7 \times 7}$$

The prime factorization of 216:

6	216
6	36
6	6
	1

$$= \sqrt[3]{216} = \sqrt[3]{6 \times 6 \times 6}$$

The prime factorization of 496:

2	496
2	248
2	124
2	62
31	31
	1

$$= \sqrt[3]{496} = \sqrt[3]{2 \times 2 \times 2 \times 2 \times 31}$$

So, only in case of 216 a perfect pair of three 6's is formed, Hence 216 is a perfect cube.

Question: 2

Which of the foll

Solution:

Having prime factors of all the numbers we get,

$$= \sqrt[3]{1152}$$

$$= \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3}$$

$= 4\sqrt[3]{2 \times 3 \times 3}$ (not a perfect cube)

11	1331
11	121
11	11
	1

$= \sqrt[3]{1331}$

$= \sqrt[3]{11 \times 11 \times 11}$

$= 11$ (perfect cube)

$= \sqrt[3]{2016}$

$= \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 7}$

$= 2\sqrt[3]{2 \times 2 \times 3 \times 3 \times 7}$

(not a perfect cube)

$= \sqrt[3]{739} =$ no prime factors are possible

Hence, only case of 1331 a perfect triplet pair of 11's is formed, Hence 1331 is a perfect cube.

Question: 3

Choose the correc

Solution:

The prime factorization of 512 is :

```
2 | 512
    -----
2 | 256
    -----
2 | 128
    -----
2 | 64
    -----
2 | 32
    -----
2 | 16
    -----
2 | 8
    -----
2 | 4
    -----
2 | 2
    -----
  | 1
```

$\sqrt[3]{512} = \sqrt[3]{8 \times 8 \times 8} = 8.$

Question: 4

Choose the correc

Solution:

The prime factorization of 125 is :

5	125
5	25
5	5
	1

$125 = 5 \times 5 \times 5$

The prime factorization of 64 is :

2	64
2	32
2	16
2	8
2	4
2	2
	1

$64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$

$= \sqrt[3]{125 \times 64} = \sqrt[3]{5 \times 5 \times 5 \times 4 \times 4 \times 4} = \sqrt[3]{5 \times 5 \times 5} \times \sqrt[3]{4 \times 4 \times 4} = 5 \times 4 = 20.$

Question: 5

Choose the correc

Solution:

2	64
2	32
2	16
2	8
2	4
2	2
	1

$64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$

7	343
7	49
7	7
	1

$343 = 7 \times 7 \times 7$

$$= \sqrt[3]{\frac{64}{343}} = \sqrt[3]{\frac{4 \times 4 \times 4}{7 \times 7 \times 7}} = \frac{\sqrt[3]{4 \times 4 \times 4}}{\sqrt[3]{7 \times 7 \times 7}} = \frac{4}{7}$$

Question: 6

Choose the correc

Solution:

The prime factorization of 512 is :

2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

The prime factorization of 729 is :

3	729
3	243
3	81
3	27
3	9
3	3
	1

$$= \sqrt[3]{-\frac{512}{729}} = \sqrt[3]{\frac{-(8 \times 8 \times 8)}{9 \times 9 \times 9}} = \frac{\sqrt[3]{-(8 \times 8 \times 8)}}{\sqrt[3]{9 \times 9 \times 9}} = -\frac{8}{9}$$

Question: 7

By what least num

Solution:

The prime factorization of 648 is :

2	648
2	324
2	162
3	81
3	27
3	9
3	3
	1

648 = 2 × 2 × 2 × 3 × 3 × 3 × 3 = 2 × 2 × 2 × 3 × 3 × 3 × 3

So, we can see that to make it a perfect cube we should complete the pair of three 3's .

Hence, it will be multiplied by = 3 × 3 = 9.

Question: 8

By what least num

Solution:

The prime factorization of 1536 is :

2	1536
2	768
2	384
2	192
2	96
2	48
2	24
2	12
2	6
3	3
	1

$1536 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 = \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times 3$

So, we can see that to make it a perfect cube we should eliminate one 3 from it.

Hence, it will be divided by = 3.

Question: 9

Choose the correc

Solution:

We have: $\left(1\frac{3}{10}\right)^3$

$= \left(\frac{13}{10}\right)^3$

$$= \frac{2197}{1000}$$

$$= 2\frac{197}{1000}$$

Question: 10s

Choose the correc

Solution:

We have:

$(0.8)^3 = 0.8 \times 0.8 \times 0.8 = 0.512$.

Exercise : CCE TEST PAPER-4

Question: 1

Evaluate

Solution:

$\left(1\frac{2}{5}\right)^3 = \left(\frac{7}{5}\right)^3 = \frac{7 \times 7 \times 7}{5 \times 5 \times 5} = \frac{343}{125}$.

Question: 2

Evaluate

Solution:

The prime factorization of 4096 is:

2	4096
2	2048
2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

$$= \sqrt[3]{4096}$$

$$= \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2}$$

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

$$= 1$$

Question: 3

Evaluate

Solution:

The prime factorization of 216 is :

2	216
2	108
2	54
3	27
3	9
3	3
	1

The prime factorization of 343 is:

7	343
7	49
7	7
	1

$343 = 7 \times 7 \times 7$

$= \sqrt[3]{216 \times 343}$

$= \sqrt[3]{216} \times \sqrt[3]{343}$

$$= \sqrt[3]{6 \times 6 \times 6} \times \sqrt[3]{7 \times 7 \times 7}$$

$$= 6 \times 7$$

$$= 42$$

Question: 4

Evaluate

Solution:

2	64
2	32
2	16
2	8
2	4
2	2
	1

64 = 2 × 2 × 2 × 2 × 2 × 2

125,

5	125
5	25
5	5
	1

$$= \sqrt[3]{-\frac{64}{125}} = \sqrt[3]{-\frac{(4 \times 4 \times 4)}{5 \times 5 \times 5}} = \frac{\sqrt[3]{-(4 \times 4 \times 4)}}{\sqrt[3]{5 \times 5 \times 5}} = -\frac{4}{5}$$

Question: 5

Choose the correc

Solution:

$$= \left(1\frac{3}{4}\right)^3$$

$$= \left(\frac{7}{4}\right)^3$$

$$= \frac{7 \times 7 \times 7}{4 \times 4 \times 4}$$

$$= \frac{343}{64}$$

$$= 5\frac{23}{64}.$$

Question: 6

Which of the foll

Solution:

From the prime factorization of 121, we get,

11	121
11	11
	1

121 = 11 × 11

13	169
13	13
	1

169 = 13 × 13

```
2 | 196
  |
2 | 98
  |
7 | 49
  |
7 | 7
  |
  | 1
```

196 = 2 × 2 × 7 × 7 = 14 × 14

```
2 | 216
  |
2 | 108
  |
2 | 54
  |
3 | 27
  |
3 | 9
  |
3 | 3
  |
  | 1
```

216 = 2 × 2 × 2 × 3 × 3 × 3 = 2 × 3 = 6

Hence, in case of 216 perfect triplet pairs of 2's and 3's is formed, so 216 is a perfect cube.

Question: 7

Choose the correc

Solution:

```
2 | 216
------
2 | 108
------
2 | 54
------
3 | 27
------
3 | 9
------
3 | 3
------
  | 1
```

$216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$

```
2 | 64
------
2 | 32
------
2 | 16
------
2 | 8
------
2 | 4
------
2 | 2
------
  | 1
```

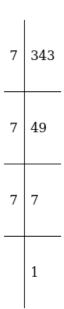$64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$

$= \sqrt[3]{216 \times 64}$

$= \sqrt[3]{216} \times \sqrt[3]{64}$

$= \sqrt[3]{6 \times 6 \times 6} \times \sqrt[3]{4 \times 4 \times 4}$

$= 6 \times 4 = 24.$

Question: 8

Choose the correc

Solution:

```
7 | 343

7 | 49

7 | 7

    1
```

$343 = 7 \times 7 \times 7$

3	729
3	243
3	81
3	27
3	9
3	3
	1

$$= \sqrt[3]{-\frac{343}{729}}$$

$$= \frac{\sqrt[3]{-(343)}}{\sqrt[3]{729}}$$

$$= \frac{\sqrt[3]{-(7 \times 7 \times 7)}}{\sqrt[3]{9 \times 9 \times 9}}$$

$$= -\frac{7}{9}$$

Question: 9

By what least num

Solution:

From the prime factorization of 324 we get,

2	324
2	162
3	81
3	27
3	9
3	3
	1

= 324 = 2 × 2 × 3 × 3 × 3 × 3 = <u>3 × 3 × 3</u> × 2 × 2 × 3

So to make it a perfect cube we must complete the triplet pairs of 2's and 3's.

Hence, it will be multiplied by 2 × 3 × 3 = 18.

Question: 10

Choose the correc

Solution:

From the prime factorization of 128, we get,

2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

From the prime factorization of 250, we get,

2	250
5	125
5	25
5	5
	1

$$= \sqrt[3]{\frac{128}{250}}$$

$$= \frac{\sqrt[3]{128}}{\sqrt[3]{250}}$$

$$= \frac{\sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2}}{\sqrt[3]{2 \times 5 \times 5 \times 5}}$$

$$= \frac{4\sqrt[3]{2}}{5\sqrt[3]{2}}$$

$$= \frac{4}{5}$$

Question: 51

Which of the foll

Solution:

From the prime factorization of 216, we get,

2	216
2	108
2	54
3	27
3	9
3	3
	1

216 = 2×2×2×3×3×3

From the prime factorization of 512, we get,

2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

From the prime factorization of 343, we get,

7	343
7	49
7	7
	1

343 = 7×7×7

From the prime factorization of 1000, we get,

2	1000
2	500
2	250
5	125
5	25
5	5
	1

216 = 6 × 6 × 6

512 = 8 × 8 × 8

343 = 7 × 7 × 7

1000 = 10 × 10 × 10

Hence, we can see clearly that 343 is a cube of an odd number.

Question: 5

Fill in the blank

Solution:

(i) = $\sqrt[3]{ab} = \left(\sqrt[3]{a}\right) \times \left(\sqrt[3]{b}\right)$

(ii) = $\sqrt[3]{\dfrac{a}{b}}$

= $\dfrac{\sqrt[3]{a}}{\sqrt[3]{b}}$.

(iii) = $\sqrt[3]{-x} = -\sqrt[3]{x}$.

(iv) = 0.5^3

= 0.5 × 0.5 × 0.5

= 0.125.