Chapter 4: Cube and Cube Roots

Exercise: 4A

Page Number: 64

Question 1.

(i)

Solution: $(8)^3 = 8 \times 8 \times 8 = 512$

(ii)

Solution: $(15)^3 = 15 \times 15 \times 15 = 3375$

(iii)

Solution: $(21)^3 = 21 \times 21 \times 21 = 9261$

(iv)

Solution: $(60)^3 = 60 \times 60 \times 60 = 512000$

Question 2.

(i)

Solution: $(1.2)^3 = 1.2 \times 1.2 \times 1.2 = 1.728$

(ii)

Solution: $(1.2)^3 = 1.2 \times 1.2 \times 1.2 = 1.728$

(iii)

Solution: $(0.8)^3 = 0.8 \times 0.8 \times 0.8 = 0.512$

(iv)

Solution: $(0.05)^3 = 0.05 \times 0.05 \times 0.05 = 0.000125$

Question 3.

(i)

Solution: $\left(\frac{4}{7}\right)^3 = \frac{4}{7} \times \frac{4}{7} \times \frac{4}{7} = \frac{64}{343}$

(ii)

Solution: $\left(\frac{10}{11}\right)^3 = \frac{10}{11} \times \frac{10}{11} \times \frac{10}{11} = \frac{1000}{1331}$

(iii)

Solution: $\left(\frac{1}{15}\right)^3 = \frac{1}{15} \times \frac{1}{15} \times \frac{1}{15} = \frac{1}{3375}$

(iv)

Solution: $\left(1\frac{3}{10}\right) = \left(\frac{13}{10}\right)^3 = \frac{13}{10} \times \frac{13}{10} \times \frac{13}{10} = \frac{2197}{1000}$

Question 4.

(i)

Solution: Prime factorization of 125 is 5,5,5.

By making triplets, one triplet of 5 is found. Therefore cube root of 125 is 5

(ii)

Solution: Prime factorization of 243 is 3,3,3,3,3.

By making triplets, one triplet of 3 is found but two factors are still left. Therefore 243 is not a perfect cube.

(iii)

Solution: Prime factorization of 343 is7,7,7.

By making triplets, one triplet of 7 is found. Therefore cube root of 343 is 7

(iv)

Solution: Prime factorization of 256 is 2,2,2,2,2,2,2,2.

By making triplets, two triplets of 2 are found but two factors are still left. Therefore 256 is not a perfect cube.

(v)

Solution: Prime factorization of 8000 is 2,2,2,2,2,2,5,5,5.

By making triplets, one triplet of 5 and 2 triplets of 2 are found. Therefore cube root of 8000 is $2 \times 2 \times 5 = 20$

(vi)

Solution: Prime factorization of 9261 is 3,3,3,7,7,7.

By making triplets, one triplet of 3 and 1 triplet of 7 is found. Therefore cube root of 9261 is $3\times7=21$

(vii)

Solution: Prime factorization of 5324 is 2,2,11,11,11.

By making triplets, one triplet of 11is found but two factors are still left. Therefore 5324 is not a perfect cube.

(viii)

Solution: Prime factorization of 3375 is 3,3,3,5,5,5.

By making triplets, one triplet of 5 and one triplet of 3 is found. Therefore cube root of 3375 is $3\times5=15$

Question 5.

Solution: Cube of even numbers are 216, 512, 1000

Question 6.

Solution: Cube of odd numbers are 125, 343, 9261.

Question 7.

Solution: Prime factorization of 1323 is 3,3,3,7,7.

By making triplets, one triplet of 3 is found and only one 7 is missing from the triplet of 7

Therefore the least number by which 1323 must be multiplied so that product is perfect is cube is 7.

Question 8.

Solution: Prime factorization of 2560 is 2,2,2,2,2,2,2,2,2,5

By making triplets, three triplet of 2 are found and only two 5's is missing from the triplet of 5

Therefore the least number by which 2560 must be multiplied so that product is perfect is cube is 25.

Question 9.

Solution: Prime factorization of 1600 is 2,2,2,2,2,2,5,5.

By making triplets, two triplets of 2 is found and only two 5's are extra from the triplet of 5

Therefore the least number by which 1323 must be divided so that quotient is perfect is cube is 25.

Question 10.

Solution: Prime factorization of 8788 is 2,2,13,13,13.

By making triplets, one triplet of 13 is found and only two 2's are extra from the triplet of 2

Therefore the least number by which 1323 must be divided so that quotient is perfect is cube is 4.

Chapter 4: Cube and Cube Roots
Exercise: 4B
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Question 1.

Solution: Here, $a = 2$ and $b = 5$

$a^3, \left(3a^2 \times b\right), \left(3a \times b^2\right) and b^3$

$a^3 = 8$
$3a^2 \times b = 60$
$3b^2 \times a = 150$
$b^3 = 125$

$\left(25\right)^3 = 15625$

Question 2.

Solution: Here, $a = 4$ and $b = 7$

$a^3, \left(3a^2 \times b\right), \left(3a \times b^2\right) and b^3$

$a^3 = 64$
$3a^2 \times b = 336$
$3b^2 \times a = 588$
$b^3 = 343$

$(47)^3 = 103823$

Question 3.

Solution: Here, $a = 6$ and $b = 8$

$a^3, (3a^2 \times b), (3a \times b^2) and b^3$

$a^3 = 216$
$3a^2 \times b = 864$
$3b^2 \times a = 1152$
$b^3 = 512$

$(68)^3 = 314432$

Question 4.

Solution: Here, $a = 8$ and $b = 4$

$a^3, (3a^2 \times b), (3a \times b^2) and b^3$

$a^3 = 512$
$3a^2 \times b = 768$
$3b^2 \times a = 384$
$b^3 = 64$

$(84)^3 = 592704$

Chapter 4: Cube and Cube Roots
Exercise: 4C
Page Number: 67

Question 1.
Solution: $\sqrt[3]{64} = \sqrt[3]{4 \times 4 \times 4} = 4$

Question 2.
Solution: $\sqrt[3]{343} = \sqrt[3]{7 \times 7 \times 7} = 7$

Question 3.
Solution: $\sqrt[3]{729} = \sqrt[3]{9 \times 9 \times 9} = 9$

Question 4.

Solution: $\sqrt[3]{1728} = \sqrt[3]{12 \times 12 \times 12} = 12$

Question 5.

Solution: $\sqrt[3]{9261} = \sqrt[3]{21 \times 21 \times 21} = 21$

Question 6.

Solution: $\sqrt[3]{4096} = \sqrt[3]{16 \times 16 \times 16} = 16$

Question 7.

Solution: $\sqrt[3]{8000} = \sqrt[3]{20 \times 20 \times 20} = 20$

Question 8.

Solution: $\sqrt[3]{3375} = \sqrt[3]{15 \times 15 \times 15} = 15$

Question 9.

Solution: $\sqrt[3]{-216} = -\sqrt[3]{216} = -\sqrt[3]{7 \times 7 \times 7} = -7$

Question 10.

Solution: $\sqrt[3]{-512} = -\sqrt[3]{512} = -\sqrt[3]{8 \times 8 \times 8} = -8$

Question 11.

Solution: $\sqrt[3]{-1331} = -\sqrt[3]{1331} = -\sqrt[3]{11 \times 11 \times 11} = -11$

Question 12.

Solution: $\sqrt[3]{\frac{27}{64}} = \sqrt[3]{\frac{3 \times 3 \times 3}{4 \times 4 \times 4}} = \frac{3}{4}$

Question 13.

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

Question 14.

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

Question 15.

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

Question 16.

Solution: $\sqrt[3]{64\times 729} = \sqrt[3]{64}\times\sqrt[3]{729} = 4\times 9 = 36$

Question 17.

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

Question 18.

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

Chapter 4: Cube and Cube Roots

Exercise: 4D

Page Number: 68

Question 1.

Solution: (c) 216

Question 2.

Solution: (b) 1331

Question 3.

Solution: (c) 8

Question 4.

Solution: (c) 20

Question 5.

Solution: (b) $\frac{4}{7}$

Question 6.

Solution: (b) $\frac{-8}{9}$

Question 7.

Solution: (c) 9

Question 8.

Solution: (c) 9

Question 9.

Solution: (c) $2\frac{197}{1000}$

Question 10.

Solution: (c) 0.512

Chapter 4: Cube and Cube Roots

Test Paper - 4

Page Number: 70

A. Question 1.

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

Question 2.

Solution: $\sqrt[3]{4096}=\sqrt[3]{16\times16\times16}=16$

Question 3.

Solution: $\sqrt[3]{216\times343}=\sqrt[3]{216}\times\sqrt[3]{343}=6\times7=42$

Question 4.

Solution: $\sqrt[3]{\frac{-64}{125}}=-\sqrt[3]{\frac{64}{125}}=-\sqrt[3]{\frac{4\times4\times4}{5\times5\times5}}=-\frac{4}{5}$

B. Question 5.

Solution: (c) $5\frac{27}{64}$

Question 6.

Solution: (d) 216

Question 7.

Solution: (c) 24

Question 8.

Solution: (b) $\frac{-7}{9}$

Question 9.

Solution: (d) 18

Question 10.

Solution: (c) $\frac{2}{5}$

Question 11.

Solution: (c) 343

C. Question 12.

(i)

Solution: $\sqrt[3]{b}$

(ii)

Solution: $\frac{\sqrt[3]{a}}{\sqrt[3]{b}}$

(iii)

Solution: $-\sqrt[3]{x}$

(iv)

Solution: 0.125