

Ex- 2(A)

(2) - (iv) 24000 , (v) 1728

=
$$\begin{array}{r|l} 2 & 24000 \\ \hline \end{array}$$

$$\begin{array}{r|l} 2 & 12000 \\ \hline \end{array}$$

$$\begin{array}{r|l} 2 & 6000 \\ \hline \end{array}$$

$$\begin{array}{r|l} 2 & 3000 \\ \hline \end{array}$$

$$\begin{array}{r|l} 2 & 1500 \\ \hline \end{array}$$

$$\begin{array}{r|l} 2 & 750 \\ \hline \end{array}$$

$$\begin{array}{r|l} 3 & 250 \\ \hline \end{array}$$

$$\begin{array}{r|l} 5 & 50 \\ \hline \end{array}$$

$$\begin{array}{r|l} & 5 \\ \hline \end{array}$$

$$(50, (2)^3 \times (2)^3 \times (5)^3 \times 3)$$

As, 3 is not in

triplet \therefore 24000 is

not a perfect cube.

$$\begin{array}{r|l} 2 & 1728 \\ \hline \end{array}$$

$$\begin{array}{r|l} 2 & 864 \\ \hline \end{array}$$

$$\begin{array}{r|l} 2 & 432 \\ \hline \end{array}$$

$$\begin{array}{r|l} 2 & 216 \\ \hline \end{array}$$

$$\begin{array}{r|l} 2 & 108 \\ \hline \end{array}$$

$$\begin{array}{r|l} 2 & 54 \\ \hline \end{array}$$

$$\begin{array}{r|l} 3 & 27 \\ \hline \end{array}$$

$$\begin{array}{r|l} 3 & 9 \\ \hline \end{array}$$

$$\begin{array}{r|l} 3 & 3 \\ \hline \end{array}$$

$$\begin{array}{r|l} & 1 \\ \hline \end{array}$$

So, $(2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (3 \times 3 \times 3)$

$\therefore (2)^3 \times (2)^3 \times (3)^3$

\therefore 1728 is a perfect cube number.

$$\begin{aligned} & \textcircled{3} \rightarrow (i) \ 2.1 \\ & = (2.1)^3 \\ & = \left(\frac{21}{10}\right)^3 = \frac{21 \times 21 \times 21}{10 \times 10 \times 10} \\ & = \frac{9261}{1000} = 9.261 \end{aligned}$$

$$\begin{aligned} & (ii) \ 0.4 \\ & = (0.4)^3 \\ & = \left(\frac{4}{10}\right)^3 = \frac{4 \times 4 \times 4}{10 \times 10 \times 10} = \frac{64}{1000} \\ & = 0.064 \end{aligned}$$

$$\begin{aligned} & (iii) \ 1.6 \\ & = (1.6)^3 \\ & = \left(\frac{16}{10}\right)^3 = \frac{16 \times 16 \times 16}{10 \times 10 \times 10} = \frac{4096}{1000} \\ & = 4.096 \end{aligned}$$

$$\begin{aligned} & (iv) \ 2.5 \\ & = (2.5)^3 \\ & = \left(\frac{25}{10}\right)^3 = \frac{25 \times 25 \times 25}{10 \times 10 \times 10} = \frac{15625}{1000} = 15.625 \end{aligned}$$

7) Find the least number by which 1323 must be multiplied so that the product must be a perfect cube.

$$\begin{array}{r|l} \rightarrow & 3 \mid 1323 \\ & \hline & 3 \mid 441 \\ & \hline & 3 \mid 147 \\ & \hline & 7 \mid 49 \\ & \hline & 7 \end{array}$$

So, $3 \times 3 \times 3 \times 7 \times 7 = (3)^3 \times (7)^2$

∴ Thus, 7 is not in triplet, so 7 must be multiplied to 1323 to make it a perfect cube number.

8) Find the smallest number by which ~~8768~~ 8768 must be divided so that the quotient is a perfect cube.

$$\begin{array}{r|l} \rightarrow & 2 \mid 8768 \\ & \hline & 2 \mid 4384 \\ & \hline & 2 \mid 2192 \\ & \hline & 2 \mid 1096 \\ & \hline & 2 \mid 548 \\ & \hline & 2 \mid 274 \\ & \hline 137 & \mid 137 \\ & \hline 1 & \mid 1 \\ & \hline & 1 \end{array}$$

So, $(2 \times 2 \times 2) \times (2 \times 2 \times 2) \times 137 = (2)^3 \times (2)^3 \times 137$

∴ Thus, 137 is not in a triplet. So, 137 must be divided to make 8768 a perfect cube number.

9) Find the smallest number by which 27783 be multiplied to get a perfect cube number.

$$=$$

3	27783
3	9261
3	3087
3	1029
7	343
7	49
	7

So, $3 \times 3 \times 3 \times 3 \times 7 \times 7 \times 7 = (3)^3 \times 7^3$
 $\times 3$

\therefore Thus, 3 is not in triplet, so, 3×3 must be multiplied from 27783 to make it a perfect cube number.

10) with what least number must 8640 be divided so that the quotient is a perfect cube?

$$=$$

2	8640
2	4320
2	2160
2	1080
2	540
2	270
3	135
3	45
3	15
5	5
	1

So, $(2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (3 \times 3 \times 3) \times 5$
 $S = (2)^3 \times (2)^3 \times (3)^3 \times 5$

\therefore Thus, 5 is not in a triplet, so, 5 must be divided to make 8640 a perfect cube number.

Exercise - 4(A)

(1) Find the cube of:-

(i) 7

$$= (7)^3 = 7 \times 7 \times 7$$

$$= 343$$

(ii) 11

$$= (11)^3 = 11 \times 11 \times 11$$

$$= 1331$$

(iii) 16

$$= (16)^3 = 16 \times 16 \times 16$$

$$= 4096$$

(iv) 23

$$= (23)^3 = 23 \times 23 \times 23$$

$$= 12167$$

(v) 31

$$= (31)^3 = 31 \times 31 \times 31$$

$$= 29791$$

(vi) 42

$$= (42)^3 = 42 \times 42 \times 42$$

$$= 74088$$

(vii) 54

$$= (54)^3$$

$$= 54 \times 54 \times 54$$

$$= 157464$$

(2) Find, which of the following are perfect cube no.?

(i) 243

3	243
3	81
3	27
3	9
	3

So, $3 \times 3 \times 3 \times 3 \times 3 = (3)^3 \times (3)^2$

∴ Thus, 3 is not in a triplet form, So, 243 isn't a cube number.

(ii) 588

2	588
2	294
3	147
7	49
	7

So, $2 \times 2 \times 3 \times 7 \times 7 = (2)^2 \times 3 \times (7)^2$

None of the numbers are in triplet ∴ Thus, this isn't a cube number.

(iii) 1331

11	1331
11	121
	11

So, $11 \times 11 \times 11 = (11)^3$

These are in triplet. ∴ Thus, this is a cube number.

(vi) 1938

2	1938
3	969
17	323
19	19
	1

So, $2 \times 3 \times 17 \times 19$

None of the triplets are there. ∴ Thus, this is not a cube no..

(3) Find the cubes of:-

(v) 0.12

$$= (0.12)^3$$

$$= \left[\frac{12}{100} \right]^3 = \frac{12 \times 12 \times 12}{100 \times 100 \times 100}$$

$$= \frac{1728}{1000000} = 0.001728$$

(vi) 0.02

$$= (0.02)^3$$

$$= \left[\frac{2}{100} \right]^3 = \frac{2 \times 2 \times 2}{100 \times 100 \times 100}$$

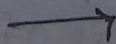
$$= \frac{8}{1000000} = ~~0.0000008~~ 0.000008$$

(vii) 0.8

$$= (0.8)^3$$

$$= \left[\frac{8}{10} \right]^3 = \frac{8 \times 8 \times 8}{10 \times 10 \times 10}$$

$$= \frac{512}{1000} = 0.512$$



(4) Find the cube of:-

(i) $\frac{3}{7}$

$$= \left[\frac{3}{7} \right]^3$$

$$= \frac{(3)^3}{(7)^3} = \frac{3 \times 3 \times 3}{7 \times 7 \times 7} = \frac{27}{243}$$

(ii) $\frac{8}{9}$

$$= \left[\frac{8}{9} \right]^3$$

$$= \frac{(8)^3}{(9)^3} = \frac{8 \times 8 \times 8}{9 \times 9 \times 9}$$

$$= \frac{512}{729}$$

(iii) $\frac{10}{13}$

$$= \left[\frac{10}{13} \right]^3$$

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

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

$$(iv) 1\frac{2}{7}$$

$$= \left(\frac{9}{7}\right)^3$$

$$= \frac{(9)^3}{(7)^3} = \frac{9 \times 9 \times 9}{7 \times 7 \times 7}$$

$$= \frac{729}{343} = 2\frac{43}{343}$$

$$(v) 2\frac{1}{2}$$

$$= \left(\frac{5}{2}\right)^3$$

$$= \frac{(5)^3}{(2)^3} = \frac{5 \times 5 \times 5}{2 \times 2 \times 2}$$

$$= \frac{125}{8} = 15\frac{5}{8}$$

5) Find the cubes of :-

$$(i) -5$$

$$= (-5)^3 = (-5) \times (-5) \times (-5)$$

$$= -125$$

$$(ii) -7$$

$$= (-7)^3 = (-7) \times (-7) \times (-7)$$

$$= -343$$

$$(iii) -13$$

$$\begin{aligned} &= (-12)^3 \\ &= (-12) \times (-12) \times (-12) \\ &= -1728 \end{aligned}$$

$$\begin{aligned} \text{(iv)} \quad &-18 \\ &= (-18)^3 \\ &= (-18) \times (-18) \times (-18) \\ &= -5832 \end{aligned}$$

$$\begin{aligned} \text{(v)} \quad &-25 \\ &= (-25)^3 \\ &= (-25) \times (-25) \times (-25) \\ &= -15625 \end{aligned}$$

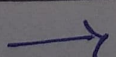
$$\begin{aligned} \text{(vi)} \quad &-30 \\ &= (-30)^3 \\ &= (-30) \times (-30) \times (-30) \\ &= -27000 \end{aligned}$$

$$\begin{aligned} \text{(vii)} \quad &-50 \\ &= (-50)^3 \\ &= (-50) \times (-50) \times (-50) \\ &= -125000 \end{aligned}$$

6) which of following are cubes of:-

- a) an even number \rightarrow 216, 8000, 4096, done
- b) a odd number \rightarrow 729, 3375, 125, 343, 9261.

216, 729, 3375, 8000, 125, 343, 4096, 9261.



(ii) which is the smallest number that must be multiplied to 77175 to make it a perfect cube?

→ 5	77175
5	15435
3	3087
3	1029
7	343
7	49
7	7
	1

$$\text{So, } 5 \times 5 \times 3 \times 3 \times (7 \times 7 \times 7) \\ = (5)^2 \times (3)^2 \times (7)^3$$

So, 5 & 3 are not in triplet.
 \therefore Thus, 5×3 must be multiplied to 77175 to make it a perfect square.

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Ex-4(B)

① Find the cube root of:-

(i) $\sqrt[3]{64}$

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

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

$= 2 \times 2 = 4$

[NOTE: $\sqrt[n]{a^m} = a^{m/n}$]

[$\sqrt[n]{a^n} = a$]

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

(v) 9261

$= \sqrt[3]{9261}$

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

[$\sqrt[3]{ab} = \sqrt[3]{a} \times \sqrt[3]{b}$] :-NOTE

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

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

$= 3 \times 7 = 21$

② (vii) $\sqrt[3]{3375 \times 512}$

$= \sqrt[3]{15^3 \times 8^3}$

$= \sqrt[3]{15^3} \times \sqrt[3]{8^3}$

$= 15 \times 8 = 120$

$$\textcircled{2} \text{ (ii) } \sqrt[3]{\frac{125}{216}}$$

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

$$\textcircled{3} \text{ (ix) } \sqrt[3]{-2744000}$$

$$= \sqrt[3]{-2744 \times 1000}$$

$$= \sqrt[3]{-2744} \times \sqrt[3]{1000}$$

$$= \sqrt[3]{(-14)^3} \times \sqrt[3]{10^3}$$

$$= -14 \times 10 = -140$$

$$\textcircled{4} \text{ (i) } \sqrt[3]{2.744}$$

$$= \frac{\sqrt[3]{2744}}{\sqrt[3]{1000}} = \frac{\sqrt[3]{2744}}{\sqrt[3]{1000}} = \frac{\sqrt[3]{14^3}}{\sqrt[3]{10^3}}$$

$$= \frac{14}{10} = 1.4$$

$$\text{(iii) } 0.000027$$

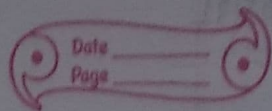
$$= \frac{\sqrt[3]{27}}{\sqrt[3]{1000000}} = \frac{\sqrt[3]{27}}{\sqrt[3]{1000000}} = \frac{\sqrt[3]{3^3}}{\sqrt[3]{(1000)^3}}$$

$$= \frac{3}{100} = 0.03$$

→

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Exercise - 4 (B)



(i) Find the cube-roots of:-

(ii) 343

7	343
7	49
7	7
	1

$$90 = 7 \times 7 \times 7 = 7^3$$

$$\sqrt[3]{343} = 7$$

(iii) 729

3	729
3	243
3	81
3	27
3	9
	3

$$90 = (3 \times 3 \times 3) \times (3 \times 3 \times 3) = 3^3 \times 3^3$$

$$= 3 \times 3$$

$$\sqrt[3]{729} = 9$$

(iv) 1728

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

$$90 = (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (3 \times 3 \times 3)$$

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

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

$$= 12$$

→

(vi) 4096

=	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

$$50 = (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (2 \times 2 \times 2)$$

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

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

$$3) 4096 = 16$$

(vii) 8000

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

$$50 = (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (5 \times 5 \times 5)$$

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

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

$$= 20$$

(viii) 3375

=	3	3375
	3	1125
	3	375
	5	125
	5	25
		5

$$= (3 \times 3 \times 3) \times (5 \times 5 \times 5)$$

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

$$= 3 \times 5$$

$$= 15$$

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(2) Find the cube-roots of :-

(i) $\frac{27}{64}$

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

$$= \frac{\sqrt[3]{3^3}}{\sqrt[3]{4^3}} = \frac{3}{4}$$

(iii) $\frac{343}{512}$

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

$$= \frac{7}{8}$$

(iv) 64×729

$$= \sqrt[3]{8^3 \times 9^3}$$

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

$$= 4 \times 9$$

$$= 36$$

(v) 64×27

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

$$= \sqrt[3]{4^3} \times \sqrt[3]{3^3} = 4 \times 3 = 12$$

(vi) 729×8000

$$= \sqrt[3]{9^3 \times 20^3}$$

$$= \sqrt[3]{9^3} \times \sqrt[3]{20^3}$$

$$= 9 \times 20 = 180$$

(3) Find the cube-roots of :-

(i) -216

$$\begin{array}{r|l} -6 & -216 \\ -6 & 36 \\ -6 & -6 \\ \hline & 1 \end{array}$$

$$= \sqrt[3]{(-6) \times (-6) \times (-6)}$$

$$= (-6)^3$$

$$= -6$$

(ii) -512

$$\begin{array}{r|l} -8 & -512 \\ -8 & 64 \\ -8 & -8 \\ \hline & 1 \end{array}$$

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

$$= (-8)^3$$

$$= -8$$

(iii) -1331

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

$$= -11$$

(iv) $-\frac{27}{125}$

$$= \frac{\sqrt{-27}}{\sqrt{125}}$$

$$= \frac{\sqrt[3]{-27}}{\sqrt[3]{125}} = \frac{\sqrt[3]{(-3) \times (-3) \times (-3)}}{\sqrt[3]{(5) \times (5) \times (5)}} = \frac{(-3)^3}{(5)^3}$$

$$= \frac{\sqrt[3]{(-3)^3}}{\sqrt[3]{(5)^3}} = -\frac{3}{5}$$

$$(v) \quad -\frac{64}{343}$$

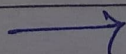
$$= \frac{\sqrt[3]{-64}}{\sqrt[3]{343}} = \frac{\sqrt[3]{-64}}{\sqrt[3]{343}}$$

$$= \frac{\sqrt[3]{(-4)^3}}{\sqrt[3]{(7)^3}} = \frac{-4}{7}$$

$$(vi) \quad \frac{512}{343}$$

$$= \frac{\sqrt[3]{512}}{\sqrt[3]{343}} = \frac{\sqrt[3]{(8)^3}}{\sqrt[3]{(7)^3}}$$

$$= \frac{8}{7}$$



(vii) -2199

$$= \begin{array}{r|l} 13 & 2199 \\ 13 & 167 \\ & 13 \end{array}$$

$$= -2199 = \sqrt[3]{-2199}$$

$$= \sqrt[3]{(-13) \times (-13) \times (-13)} = -13$$

(viii) -5832

$$= -5832 = \sqrt[3]{-5832}$$

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

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

$$= -18$$

(4) Find the cube roots of:-

(ii) 9.261

$$= \begin{array}{r|l} 3 & 9261 \\ 3 & 3087 \\ 3 & 1029 \\ 7 & 343 \\ 7 & 49 \\ 7 & 7 \\ & 1 \end{array}$$

$$= 9.261 = \sqrt[3]{\frac{9261}{1000}}$$

$$= \sqrt[3]{\frac{3 \times 3 \times 3 \times 7 \times 7 \times 7}{10 \times 10 \times 10}} = \frac{3 \times 7}{10} = \frac{21}{10}$$

$$= 2.1$$

$$(iv) -0.512$$

$$= -0.512 = \sqrt[3]{\frac{-512}{1000}} = \sqrt[3]{\frac{(-8) \times (-8) \times (-8)}{10 \times 10 \times 10}}$$

$$= \frac{-8}{10} = -0.8$$

$$(v) -15.625$$

$$= \begin{array}{r|l} 5 & 15625 \\ \hline 5 & 3125 \\ \hline 5 & 625 \\ \hline 5 & 125 \\ \hline 5 & 25 \\ \hline & 5 \end{array}$$

$$= \sqrt[3]{\frac{-(5 \times 5 \times 5) \times (5 \times 5 \times 5)}{10 \times 10 \times 10}} = \frac{-5 \times 5}{10}$$

$$= \frac{-25}{10} = -2.5$$

$$(vi) -125 \times 1000$$

$$= (-125 \times 1000)^{1/3} = \sqrt[3]{-125 \times 1000}$$

$$= \sqrt[3]{-(5 \times 5 \times 5) \times (10 \times 10 \times 10)}$$

$$= -5 \times 10 = -50$$

(5) Find the smallest number by which 26244 should be divided so that the quotient must be a perfect square.

Next page.

=	2	26244
	2	13122
	3	6561
	3	2187
	3	729
	3	243
	3	81
	3	27
	3	9
	3	3
		1

Not in triplet

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

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

$$= \underline{\underline{36}}$$

∴ So, 36 must be divided with 26244 to make it a perfect cube number.

6) What is the least number by which 30375 should be multiplied to get a perfect cube?

=	3	30375
	3	10125
	3	3375
	3	1125
	3	375
	5	125
	5	25
	5	5
		1

Not in triplet

$$= (5 \times 5 \times 5) \times (3 \times 3 \times 3) \times (3 \times 3)$$

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

∴ So, 3 should be multiplied to 30375 to make it a perfect square.

7) Find the cube roots of:-

(i) $700 \times 2 \times 49 \times 5$

$$= \sqrt[3]{700 \times 2 \times 49 \times 5} = \sqrt[3]{7 \times 100 \times 10 \times 49}$$

$$= 7 \times 10 = 70$$

$$(ii) \sqrt[3]{-216 \times 1728}$$

$$= \sqrt[3]{-216} \times \sqrt[3]{1728}$$

$$= \sqrt[3]{(-6)^3} \times \sqrt[3]{(12)^3}$$

$$= -6 \times 12 = -72$$

$$(iii) \sqrt[3]{-64 \times -125}$$

$$= \sqrt[3]{-64} \times \sqrt[3]{-125}$$

$$= \sqrt[3]{(-4)^3} \times \sqrt[3]{(-5)^3}$$

$$= -4 \times -5$$

$$= 20$$

$$(iv) \frac{-27}{343}$$

$$= \sqrt[3]{\frac{-27}{343}}$$

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

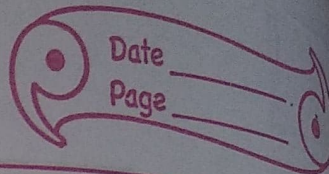
$$(v) \frac{729}{-1331}$$

$$= \sqrt[3]{\frac{729}{-1331}} = \frac{\sqrt[3]{(9)^3}}{\sqrt[3]{(-11)^3}} = \frac{\sqrt[3]{9^3}}{\sqrt[3]{(-11)^3}} = \frac{9 \times 9 \times 9}{-11 \times -11 \times -11}$$

$$= \frac{9}{-11} = -\frac{9}{11}$$

HW

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$$(vi) \quad \sqrt[3]{250.047}$$

$$= \frac{\sqrt[3]{250047}}{\sqrt[3]{1000}} = \frac{\sqrt[3]{63^3}}{\sqrt[3]{10^3}} = \frac{63}{10} = 6.3$$

$$(vii) \quad -175616$$

$$= \sqrt[3]{-175616}$$

$$= (-8 \times -8 \times -8) \times (7 \times 7 \times 7)$$

$$= -8^3 \times 7^3$$

$$= \sqrt[3]{-8^3 \times 7^3} = -8 \times 7 = -56$$