EXERCISE 4.2   **PAGE NO: 4.13**

1. Find the cubes of:
(i) -11
(ii) -12
(iii) -21
Solution:
(i) -11
The cube of 11 is
$(-11)^3 = -11 \times -11 \times -11 = -1331$

(ii) -12
The cube of 12 is
$(-12)^3 = -12 \times -12 \times -12 = -1728$

(iii) -21
The cube of 21 is
$(-21)^3 = -21 \times -21 \times -21 = -9261$

2. Which of the following integers are cubes of negative integers
(i) -64
(ii) -1056
(iii) -2197
(iv) -2744
(v) -42875
Solution:
(i) -64
The prime factors of 64 are
$64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$
$\quad = 2^3 \times 2^3$
$\quad = 4^3$
∴ 64 is a perfect cube of negative integer – 4.

(ii) -1056
The prime factors of 1056 are
$1056 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 11$
1056 is not a perfect cube.
∴ -1056 is not a cube of negative integer.

(iii) -2197

The prime factors of 2197 are

2197 = 13 × 13 × 13

$= 13^3$

∴ 2197 is a perfect cube of negative integer – 13.

(iv) -2744

The prime factors of 2744 are

2744 = 2 × 2 × 2 × 7 × 7 × 7

$= 2^3 \times 7^3$

$= 14^3$

2744 is a perfect cube.

∴ -2744 is a cube of negative integer – 14.

(v) -42875

The prime factors of 42875 are

42875 = 5 × 5 × 5 × 7 × 7 × 7

$= 5^3 \times 7^3$

$= 35^3$

42875 is a perfect cube.

∴ -42875 is a cube of negative integer – 35.

3. Show that the following integers are cubes of negative integers. Also, find the integer whose cube is the given integer.

(i) -5832

(ii) -2744000

Solution:

(i) -5832

The prime factors of 5832 are

5823 = 2 × 2 × 2 × 3 × 3 × 3 × 3 × 3 × 3

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

$= 18^3$

5832 is a perfect cube.

∴ -5832 is a cube of negative integer – 18.

(ii) -2744000

The prime factors of 2744000 are

2744000 = 2 × 2 × 2 × 2 × 2 × 2 × 5 × 5 × 5 × 7 × 7 × 7

$= 2^3 \times 2^3 \times 5^3 \times 7^3$

2744000 is a perfect cube.
∴ -2744000 is a cube of negative integer – 140.

4. Find the cube of:
(i) 7/9 (ii) -8/11
(iii) 12/7 (iv) -13/8
(v) 2 2/5 (vi) 3 1/4
(vii) 0.3 (viii) 1.5
(ix) 0.08 (x) 2.1
Solution:
(i) 7/9
The cube of 7/9 is
$(7/9)^3 = 7^3/9^3 = 343/729$

(ii) -8/11
The cube of -8/11 is
$(-8/11)^3 = -8^3/11^3 = -512/1331$

(iii) 12/7
The cube of 12/7 is
$(12/7)^3 = 12^3/7^3 = 1728/343$

(iv) -13/8
The cube of -13/8 is
$(-13/8)^3 = -13^3/8^3 = -2197/512$

(v)2 2/5
The cube of 12/5 is
$(12/5)^3 = 12^3/5^3 = 1728/125$

(vi) 3 ¼
The cube of 13/4 is
$(13/4)^3 = 13^3/4^3 = 2197/64$

(vii) 0.3
The cube of 0.3 is
$(0.3)^3 = 0.3×0.3×0.3 = 0.027$

(viii) 1.5

The cube of 1.5 is
$(1.5)^3 = 1.5 \times 1.5 \times 1.5 = 3.375$

(ix) 0.08
The cube of 0.08 is
$(0.08)^3 = 0.08 \times 0.08 \times 0.08 = 0.000512$

(x) 2.1
The cube of 2.1 is
$(2.1)^3 = 2.1 \times 2.1 \times 2.1 = 9.261$

5. Find which of the following numbers are cubes of rational numbers:
(i) 27/64
(ii) 125/128
(iii) 0.001331
(iv) 0.04
Solution:
(i) 27/64
We have,
$27/64 = (3 \times 3 \times 3)/ (4 \times 4 \times 4) = 3^3/4^3 = (3/4)^3$
∴ 27/64 is a cube of 3/4.

(ii) 125/128
We have,
$125/128 = (5 \times 5 \times 5)/ (2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2) = 5^3/ (2^3 \times 2^3 \times 2)$
∴ 125/128 is not a perfect cube.

(iii) 0.001331
We have,
$1331/1000000 = (11 \times 11 \times 11)/ (100 \times 100 \times 100) = 11^3/100^3 = (11/100)^3$
∴ 0.001331 is a perfect cube of 11/100

(iv) 0.04
We have,
$4/10 = (2 \times 2)/(2 \times 5) = 2^2/(2 \times 5)$
∴ 0.04 is not a perfect cube.