

EXERCISE 4.2

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

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

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

$$= 4^3$$

\therefore 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.

\therefore -1056 is not a cube of negative integer.

(iii) -2197

The prime factors of 2197 are

$$\begin{aligned}2197 &= 13 \times 13 \times 13 \\ &= 13^3\end{aligned}$$

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

(iv) -2744

The prime factors of 2744 are

$$\begin{aligned}2744 &= 2 \times 2 \times 2 \times 7 \times 7 \times 7 \\ &= 2^3 \times 7^3 \\ &= 14^3\end{aligned}$$

2744 is a perfect cube.

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

(v) -42875

The prime factors of 42875 are

$$\begin{aligned}42875 &= 5 \times 5 \times 5 \times 7 \times 7 \times 7 \\ &= 5^3 \times 7^3 \\ &= 35^3\end{aligned}$$

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

$$\begin{aligned}5832 &= 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \\ &= 2^3 \times 3^3 \times 3^3 \\ &= 18^3\end{aligned}$$

5832 is a perfect cube.

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

(ii) -2744000

The prime factors of 2744000 are

$$\begin{aligned}2744000 &= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5 \times 7 \times 7 \times 7 \\ &= 2^3 \times 2^3 \times 5^3 \times 7^3\end{aligned}$$

2744000 is a perfect cube.

\therefore -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) $2\frac{2}{5}$ (vi) $3\frac{1}{4}$

(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) $2\frac{2}{5}$

The cube of $12/5$ is

$$(12/5)^3 = 12^3/5^3 = 1728/125$$

(vi) $3\frac{1}{4}$

The cube of $13/4$ is

$$(13/4)^3 = 13^3/4^3 = 2197/64$$

(vii) 0.3

The cube of 0.3 is

$$(0.3)^3 = 0.3 \times 0.3 \times 0.3 = 0.027$$

(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,

$$27/64 = (3 \times 3 \times 3) / (4 \times 4 \times 4) = 3^3/4^3 = (3/4)^3$$

$\therefore 27/64$ is a cube of $3/4$.

(ii) $125/128$

We have,

$$125/128 = (5 \times 5 \times 5) / (2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2) = 5^3 / (2^3 \times 2^3 \times 2)$$

$\therefore 125/128$ is not a perfect cube.

(iii) 0.001331

We have,

$$1331/1000000 = (11 \times 11 \times 11) / (100 \times 100 \times 100) = 11^3/100^3 = (11/100)^3$$

$\therefore 0.001331$ is a perfect cube of $11/100$

(iv) 0.04

We have,

$$4/10 = (2 \times 2) / (2 \times 5) = 2^2 / (2 \times 5)$$

$\therefore 0.04$ is not a perfect cube.