

## Exercise 7.1

### Question 1:

Which of the following numbers are not perfect cubes:

- |       |       |      |     |
|-------|-------|------|-----|
| (i)   | 216   | (ii) | 128 |
| (iii) | 1000  | (iv) | 100 |
| (v)   | 46656 |      |     |

### Answer 1:

- (i) 216

Prime factors of 216 =  $2 \times 2 \times 2 \times 3 \times 3 \times 3$

Here all factors are in groups of 3's (in triplets)

Therefore, 216 is a perfect cube number.

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

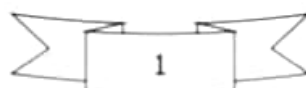
- (ii) 128

Prime factors of 128 =  $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

Here one factor 2 does not appear in a 3's group.

Therefore, 128 is not a perfect cube.

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



(iii) 1000

Prime factors of 1000 =  $2 \times 2 \times 2 \times 3 \times 3 \times 3$   
Here all factors appear in 3's group.  
Therefore, 1000 is a perfect cube.

|          |             |
|----------|-------------|
| <b>2</b> | <b>1000</b> |
| 2        | 500         |
| 2        | 250         |
| 5        | 125         |
| 5        | 25          |
| 5        | 5           |
|          | 1           |

(iv) 100

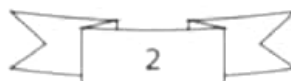
Prime factors of 100 =  $2 \times 2 \times 5 \times 5$   
Here all factors do not appear in 3's group.  
Therefore, 100 is not a perfect cube.

|          |            |
|----------|------------|
| <b>2</b> | <b>100</b> |
| 2        | 50         |
| 5        | 25         |
| 5        | 5          |
|          | 1          |

(v) 46656

Prime factors of 46656 =  $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$   
Here all factors appear in 3's group.  
Therefore, 46656 is a perfect cube.

|          |              |
|----------|--------------|
| <b>2</b> | <b>46656</b> |
| 2        | 23328        |
| 2        | 11664        |
| 2        | 5832         |
| 2        | 2916         |
| 2        | 1458         |
| 3        | 729          |
| 3        | 243          |
| 3        | 81           |
| 3        | 27           |
| 3        | 9            |
| 3        | 3            |
|          | 1            |



**Question 2:**

Find the smallest number by which each of the following numbers must be multiplied to obtain a perfect cube:

(i) 243

(ii) 256

(iii) 72

(iv) 675

(v) 100

**Answer 2:**

(i) 243

Prime factors of 243 =  $3 \times 3 \times 3 \times 3 \times 3$

Here 3 does not appear in 3's group.

Therefore, 243 must be multiplied by 3 to make it a perfect cube.

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

(ii) 256

Prime factors of 256 =  $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

Here one factor 2 is required to make a 3's group.

Therefore, 256 must be multiplied by 2 to make it a perfect cube.

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

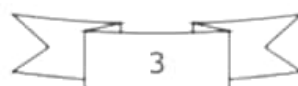
(iii) 72

Prime factors of 72 =  $2 \times 2 \times 2 \times 3 \times 3$

Here 3 does not appear in 3's group.

Therefore, 72 must be multiplied by 3 to make it a perfect cube.

|   |    |
|---|----|
| 2 | 72 |
| 2 | 36 |
| 2 | 18 |
| 3 | 9  |
| 3 | 3  |
|   | 1  |



(iv) 675

Prime factors of 675 =  $3 \times 3 \times 3 \times 5 \times 5$

Here factor 5 does not appear in 3's group.

Therefore 675 must be multiplied by 3 to make it a perfect cube.

|   |     |
|---|-----|
| 3 | 675 |
| 3 | 225 |
| 3 | 75  |
| 5 | 25  |
| 5 | 5   |
|   | 1   |

(v) 100

Prime factors of 100 =  $2 \times 2 \times 5 \times 5$

Here factor 2 and 5 both do not appear in 3's group.

Therefore 100 must be multiplied by  $2 \times 5 = 10$  to make it a perfect cube.

|   |     |
|---|-----|
| 2 | 100 |
| 2 | 50  |
| 5 | 25  |
| 5 | 5   |
|   | 1   |

### Question 3:

Find the smallest number by which each of the following numbers must be divided to obtain a perfect cube:

(i) 81

(ii) 128

(iii) 135

(iv) 192

(v) 704

### Answer 3:

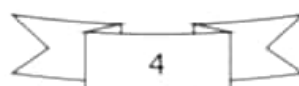
(i) 81

Prime factors of 81 =  $3 \times 3 \times 3 \times 3$

Here one factor 3 is not grouped in triplets.

Therefore 81 must be divided by 3 to make it a perfect cube.

|   |    |
|---|----|
| 3 | 81 |
| 3 | 27 |
| 3 | 9  |
| 3 | 3  |
|   | 1  |



(ii) 128

Prime factors of 128 =  $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

Here one factor 2 does not appear in a 3's group.

Therefore, 128 must be divided by 2 to make it a perfect cube.

|          |            |
|----------|------------|
| <b>2</b> | <b>128</b> |
| <b>2</b> | 64         |
| <b>2</b> | 32         |
| <b>2</b> | 16         |
| <b>2</b> | 8          |
| <b>2</b> | 4          |
| <b>2</b> | 2          |
|          | 1          |

(iii) 135

Prime factors of 135 =  $3 \times 3 \times 3 \times 5$

Here one factor 5 does not appear in a triplet.

Therefore, 135 must be divided by 5 to make it a perfect cube.

|          |            |
|----------|------------|
| <b>3</b> | <b>135</b> |
| <b>3</b> | 45         |
| <b>3</b> | 15         |
| <b>5</b> | 5          |
|          | 1          |

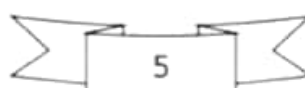
(iv) 192

Prime factors of 192 =  $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3$

Here one factor 3 does not appear in a triplet.

Therefore, 192 must be divided by 3 to make it a perfect cube.

|          |            |
|----------|------------|
| <b>2</b> | <b>192</b> |
| <b>2</b> | 96         |
| <b>2</b> | 48         |
| <b>2</b> | 24         |
| <b>2</b> | 12         |
| <b>2</b> | 6          |
| <b>3</b> | 3          |
|          | 1          |



(v) 704

Prime factors of 704 =  $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 11$

Here one factor 11 does not appear in a triplet.

Therefore, 704 must be divided by 11 to make it a perfect cube.

|   |     |
|---|-----|
| 2 | 704 |
| 2 | 352 |
| 2 | 176 |
| 2 | 88  |
| 2 | 44  |
| 2 | 22  |
| 2 | 11  |
|   | 1   |

#### Question 4:

Parikshit makes a cuboid of plasticine of sides 5 cm, 2 cm, 5 cm. How many such cuboids will he need to form a cube?

**Answer 4:**

Given numbers =  $5 \times 2 \times 5$

Since, Factors of 5 and 2 both are not in group of three.

Therefore, the number must be multiplied by  $2 \times 2 \times 5 = 20$  to make it a perfect cube.

Hence he needs 20 cuboids.

