

Cubes and Cube Roots

Question Paper, Set 03

Time: 1 hour 30 minutes

Maximum marks: 50

Name: _____ Class: _____ Date: _____

1. Answer all 20 questions. The marks for each question are shown in brackets.
2. Show your working for the 2, 3 and 5 mark questions.
3. The key sheet and worked solutions are at the end of this paper.

1. How do we read x^3 ? [1 mark]
2. Write $r \times r \times r \times t \times t \times t$ in power form. [2 marks]
3. Write the next number in the pattern 8, 27, 64, 125, ... [1 mark]
4. Between the cubes of which two consecutive numbers does 200 lie? [2 marks]
5. Which of these numbers are cubes? Write each cube as the cube of a number: 27, 36, 64, 81, 100, 125. [3 marks]
6. Fill in the boxes: $13^3 = 13 \times 13 \times 13 = \square \times 13 = \square$ [2 marks]
7. Asha wrote $14^3 = 14 \times 3 = 42$. (i) What mistake did she make? (ii) Find the correct value of 14^3 by first finding 14×14 . (iii) In the same way, find 12^3 . [5 marks]
8. The cube of which number is -343 ? [1 mark]
9. Ravi wrote $(-6)^3 = 216$. Is he right? Write the correct value. [2 marks]
10. Find $(-11)^3$ by first finding $(-11) \times (-11)$. [3 marks]
11. Find the sum of the cubes of 3 and 5. [1 mark]
12. Show that $3^3 + 4^3 + 5^3 = 6^3$. [5 marks]
13. Find $3^3 + (-2)^3$. [1 mark]
14. Find $(-4)^3 + 7^3$. [2 marks]
15. By how much is 9^3 more than 6^3 ? [2 marks]
16. Find $10^3 - 12^3$. [3 marks]
17. Kiran wrote: $12^3 - 15^3 = (12 - 15)^3 = (-3)^3 = -27$. (i) Find the correct value of $12^3 - 15^3$. (ii) What was Kiran's mistake? [5 marks]
18. Simplify $-q^3 - (-q)^3$. [1 mark]

19. Find $(-6)^3 - (-3)^3$.

[3 marks]

20. Find the values of: (i) $6^3 + (-6)^3$ (ii) $6^3 - (-6)^3$ (iii) $-6^3 - (-6)^3$ (iv) $-6^3 - 6^3$

[5 marks]

Key sheet

Q	Answer
1	x power 3 (or) x cubed
2	$r^3 \times t^3$
3	216
4	Between 5^3 and 6^3
5	$27 = 3^3$, $64 = 4^3$, $125 = 5^3$
6	169 and 2197
7	(ii) $14^3 = 2744$ (iii) $12^3 = 1728$
8	-7
9	No. $(-6)^3 = -216$
10	-1331
11	152
12	Both sides are 216
13	19
14	279
15	513
16	-728
17	(i) -1647 (ii) He subtracted the numbers before cubing them
18	0
19	-189
20	(i) 0 (ii) 432 (iii) 0 (iv) -432

Solutions

1. How do we read x^3 ? [1]

$$x^3 = x \times x \times x$$

It is read as 'x power 3' (or) 'x cubed'.

Ans: x power 3 (or) x cubed

2. Write $r \times r \times r \times t \times t \times t$ in power form. [2]

$$r \times r \times r = r^3$$

$$t \times t \times t = t^3$$

$$\therefore r \times r \times r \times t \times t \times t = r^3 \times t^3$$

Ans: $r^3 \times t^3$

3. Write the next number in the pattern 8, 27, 64, 125, ... [1]

These are $2^3, 3^3, 4^3, 5^3$.

$\therefore$ the next number is $6^3 = 216$

Ans: 216

4. Between the cubes of which two consecutive numbers does 200 lie? [2]

From the table: $5^3 = 125$ and $6^3 = 216$.

$$125 < 200 < 216$$

So 200 lies between 5^3 and 6^3 .

Ans: Between 5^3 and 6^3

5. Which of these numbers are cubes? Write each cube as the cube of a number: 27, 36, 64, 81, 100, 125. [3]

Check each number with the table of cubes.

$$3^3 = 27$$

$$4^3 = 64$$

$$5^3 = 125$$

The other numbers are not in the table of cubes, so they are not cubes.

Ans: $27 = 3^3, 64 = 4^3, 125 = 5^3$

6. Fill in the boxes: $13^3 = 13 \times 13 \times 13 = \square \times 13 = \square$ [2]

$$13 \times 13 = 169$$

$$169 \times 13 = 2197$$

$$\therefore 13^3 = 169 \times 13 = 2197$$

Ans: 169 and 2197

7. Asha wrote $14^3 = 14 \times 3 = 42$. (i) What mistake did she make? (ii) Find the correct value of 14^3 by first finding 14×14 . (iii) In the same way, find 12^3 . [5]

(i) She multiplied 14 by 3. But 14^3 means 14 multiplied by itself 3 times.

(ii) $14 \times 14 = 196$, $196 \times 14 = 2744$

(iii) $12 \times 12 = 144$, $144 \times 12 = 1728$

Ans: (ii) $14^3 = 2744$ (iii) $12^3 = 1728$

8. The cube of which number is -343 ? [1]

$$(-7)^3 = -7^3 = -343$$

So -343 is the cube of -7 .

Ans: -7

9. Ravi wrote $(-6)^3 = 216$. Is he right? Write the correct value. [2]

$$(-6)^3 = (-6) \times (-6) \times (-6)$$

$$= 36 \times (-6) = -216$$

A negative number multiplied 3 times gives a negative answer, so Ravi is wrong.

Ans: No. $(-6)^3 = -216$

10. Find $(-11)^3$ by first finding $(-11) \times (-11)$. [3]

$$(-11) \times (-11) = 121$$

$$121 \times (-11) = -1331$$

$$\therefore (-11)^3 = -1331$$

Ans: -1331

11. Find the sum of the cubes of 3 and 5. [1]

$$3^3 + 5^3 = 27 + 125$$

$$= 152$$

Ans: 152

12. Show that $3^3 + 4^3 + 5^3 = 6^3$. [5]

$$\text{LHS } 3^3 + 4^3 + 5^3 = 27 + 64 + 125$$

$$= 216$$

$$\text{RHS} = 6^3 = 36 \times 6 = 216$$

$$\text{LHS} = \text{RHS} = 216$$

Ans: Both sides are 216

13. Find $3^3 + (-2)^3$. [1]

$$3^3 + (-2)^3 = 27 + (-8)$$

$$= 27 - 8$$

$$= 19$$

Ans: 19

14. Find $(-4)^3 + 7^3$. [2]

$$\begin{aligned}(-4)^3 + 7^3 &= -64 + 343 \\ &= 279\end{aligned}$$

Ans: 279

15. By how much is 9^3 more than 6^3 ? [2]

$$\begin{aligned}\text{Difference} &= 9^3 - 6^3 \\ 9^3 - 6^3 &= 729 - 216 \\ &= 513\end{aligned}$$

Ans: 513

16. Find $10^3 - 12^3$. [3]

$$\begin{aligned}12^3 &= 144 \times 12 = 1728 \\ 10^3 - 12^3 &= 1000 - 1728 \\ &= -728\end{aligned}$$

Ans: -728

17. Kiran wrote: $12^3 - 15^3 = (12 - 15)^3 = (-3)^3 = -27$. (i) Find the correct value of $12^3 - 15^3$. (ii) What was Kiran's mistake? [5]

$$\begin{aligned}\text{(i)} \quad 12^3 &= 144 \times 12 = 1728 \\ 15^3 &= 225 \times 15 = 3375 \\ 12^3 - 15^3 &= 1728 - 3375 = -1647\end{aligned}$$

(ii) Each number must be cubed first and then subtracted. $12^3 - 15^3$ is not $(12 - 15)^3$.

Ans: (i) -1647 (ii) He subtracted the numbers before cubing them

18. Simplify $-q^3 - (-q)^3$. [1]

$$\begin{aligned}(-q)^3 &= -q^3 \\ -q^3 - (-q^3) &= -q^3 + q^3 = 0\end{aligned}$$

Ans: 0

19. Find $(-6)^3 - (-3)^3$. [3]

$$\begin{aligned}(-6)^3 - (-3)^3 &= -216 - (-27) \\ &= -216 + 27 \\ &= -189\end{aligned}$$

Ans: -189

20. Find the values of: (i) $6^3 + (-6)^3$ (ii) $6^3 - (-6)^3$ (iii) $-6^3 - (-6)^3$ (iv) $-6^3 - 6^3$ [5]

$$\begin{aligned}6^3 &= 216 \text{ and } (-6)^3 = -216 \\ \text{(i)} \quad 6^3 + (-6)^3 &= 216 + (-216), = 216 - 216, = 0 \\ \text{(ii)} \quad 6^3 - (-6)^3 &= 216 - (-216), = 216 + 216, = 432 \\ \text{(iii)} \quad -6^3 - (-6)^3 &= -216 - (-216), = -216 + 216, = 0 \\ \text{(iv)} \quad -6^3 - 6^3 &= -216 - 216, = -432\end{aligned}$$

Ans: (i) 0 (ii) 432 (iii) 0 (iv) -432
