

Cubes and Cube Roots

Question Paper, Set 01

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. Write $6 \times 6 \times 6$ in power form. [1 mark]
2. Write 9^3 as a product and find its value. [2 marks]
3. Find the value of 7^3 . [1 mark]
4. Using the table of cubes, write the values of 6^3 and 9^3 . [2 marks]
5. Write the cubes of all the even numbers from 1 to 10. [3 marks]
6. Find 12^3 by first finding 12×12 . [2 marks]
7. Find the cubes of 11, 20 and 15, showing each step. [5 marks]
8. Find $(-8)^3$. [1 mark]
9. Write $(-10)^3$ as a product and find its value. [2 marks]
10. Find the cubes of -6 , -8 and -10 . [3 marks]
11. Find $2^3 + 4^3$. [1 mark]
12. Find the sum of the cubes of all the odd numbers from 1 to 7. [5 marks]
13. Find $13^3 + (-13)^3$. [1 mark]
14. Find $4^3 + (-6)^3$. [2 marks]
15. Find $3^3 - 8^3$. [2 marks]
16. Find $5^3 - 8^3$ and $8^3 - 5^3$. What do you notice? [3 marks]
17. Two big cubes are built from small cubes. The first has 7 small cubes along each edge and the second has 10. (i) How many small cubes are in each big cube? (ii) How many more small cubes does the second cube have? [5 marks]
18. Find $-20^3 - (-20)^3$. [1 mark]
19. Find $4^3 - (-3)^3$. [3 marks]

20. Find $1^3 - 2^3 + 3^3 - 4^3 + 5^3$.

[5 marks]

Key sheet

Q	Answer
1	6^3
2	$9 \times 9 \times 9 = 729$
3	343
4	$6^3 = 216, 9^3 = 729$
5	$2^3 = 8, 4^3 = 64, 6^3 = 216, 8^3 = 512, 10^3 = 1000$
6	1728
7	$11^3 = 1331, 20^3 = 8000, 15^3 = 3375$
8	-512
9	$(-10) \times (-10) \times (-10) = -1000$
10	$(-6)^3 = -216, (-8)^3 = -512, (-10)^3 = -1000$
11	72
12	496
13	0
14	-152
15	-485
16	-387 and 387; same number with opposite signs
17	(i) 343 and 1000 (ii) 657
18	0
19	91
20	81

Solutions

1. Write $6 \times 6 \times 6$ in power form. [1]

6 is multiplied by itself 3 times.

$$\therefore 6 \times 6 \times 6 = 6^3$$

Ans: 6^3

2. Write 9^3 as a product and find its value. [2]

$$9^3 = 9 \times 9 \times 9$$

$$= 81 \times 9 = 729$$

Ans: $9 \times 9 \times 9 = 729$

3. Find the value of 7^3 . [1]

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

$$= 49 \times 7 = 343$$

Ans: 343

4. Using the table of cubes, write the values of 6^3 and 9^3 . [2]

$$6^3 = 6 \times 6 \times 6 = 216$$

$$9^3 = 9 \times 9 \times 9 = 729$$

Ans: $6^3 = 216$, $9^3 = 729$

5. Write the cubes of all the even numbers from 1 to 10. [3]

$$2^3 = 2 \times 2 \times 2 = 8$$

$$4^3 = 4 \times 4 \times 4 = 64$$

$$6^3 = 6 \times 6 \times 6 = 216$$

$$8^3 = 8 \times 8 \times 8 = 512$$

$$10^3 = 10 \times 10 \times 10 = 1000$$

Ans: $2^3 = 8$, $4^3 = 64$, $6^3 = 216$, $8^3 = 512$, $10^3 = 1000$

6. Find 12^3 by first finding 12×12 . [2]

$$12 \times 12 = 144$$

$$12^3 = 144 \times 12 = 1728$$

Ans: 1728

7. Find the cubes of 11, 20 and 15, showing each step. [5]

$$11 \times 11 = 121, 121 \times 11 = 1331$$

$$20 \times 20 = 400, 400 \times 20 = 8000$$

$$15 \times 15 = 225, 225 \times 15 = 3375$$

$$11^3 = 1331, 20^3 = 8000, 15^3 = 3375$$

Ans: $11^3 = 1331$, $20^3 = 8000$, $15^3 = 3375$

8. Find $(-8)^3$. [1]

$$(-8)^3 = -8^3$$

$$= -512$$

Ans: -512

9. Write $(-10)^3$ as a product and find its value. [2]

$$(-10)^3 = (-10) \times (-10) \times (-10)$$

$$= 100 \times (-10) = -1000$$

Ans: $(-10) \times (-10) \times (-10) = -1000$

10. Find the cubes of -6 , -8 and -10 . [3]

$$(-6)^3 = -6^3 = -(36 \times 6) = -216$$

$$(-8)^3 = -8^3 = -(64 \times 8) = -512$$

$$(-10)^3 = -10^3 = -(100 \times 10) = -1000$$

Ans: $(-6)^3 = -216$, $(-8)^3 = -512$, $(-10)^3 = -1000$

11. Find $2^3 + 4^3$. [1]

$$2^3 + 4^3 = 8 + 64$$

$$= 72$$

Ans: 72

12. Find the sum of the cubes of all the odd numbers from 1 to 7. [5]

$$1^3 + 3^3 + 5^3 + 7^3 = 1 + 27 + 125 + 343$$

$$= 496$$

Ans: 496

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

$$(-13)^3 = -13^3$$

$$13^3 + (-13)^3 = 13^3 - 13^3 = 0$$

Ans: 0

14. Find $4^3 + (-6)^3$. [2]

$$4^3 + (-6)^3 = 64 + (-216)$$

$$= 64 - 216$$

$$= -152$$

Ans: -152

15. Find $3^3 - 8^3$. [2]

$$3^3 - 8^3 = 27 - 512$$

8^3 is bigger than 3^3 , so the answer is negative.

$$= -485$$

Ans: -485

16. Find $5^3 - 8^3$ and $8^3 - 5^3$. What do you notice? [3]

$$5^3 - 8^3 = 125 - 512 = -387$$

$$8^3 - 5^3 = 512 - 125 = 387$$

Changing the order of subtraction changes only the sign of the answer.

Ans: -387 and 387 ; same number with opposite signs

17. Two big cubes are built from small cubes. The first has 7 small cubes along each edge and the second has 10. (i) How many small cubes are in each big cube? (ii) How many more small cubes does the second cube have? [5]

(i) First: $7^3 = 7 \times 7 \times 7 = 343$

Second: $10^3 = 10 \times 10 \times 10 = 1000$

(ii) $1000 - 343 = 657$

Ans: (i) 343 and 1000 (ii) 657

18. Find $-20^3 - (-20)^3$. [1]

$$(-20)^3 = -20^3$$

$$-20^3 - (-20)^3 = -20^3 + 20^3 = 0$$

Ans: 0

19. Find $4^3 - (-3)^3$. [3]

$$4^3 - (-3)^3 = 64 - (-27)$$

$$= 64 + 27$$

$$= 91$$

Ans: 91

20. Find $1^3 - 2^3 + 3^3 - 4^3 + 5^3$. [5]

$$1^3 - 2^3 + 3^3 - 4^3 + 5^3 = 1 - 8 + 27 - 64 + 125$$

$$= 81$$

Ans: 81
