

Cubes and Cube Roots

Question Paper, Set 08

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 z^3 as a product of z 's. [1 mark]
2. Ravi says $7^3 = 7 \times 3 = 21$. Is he right? Give the correct value. [2 marks]
3. 27 is the cube of which number? [1 mark]
4. A carton holds soap boxes in 7 layers. Each layer has 7 rows with 7 boxes in each row. How many soap boxes are in the carton? [2 marks]
5. Fill in the boxes using the table of cubes: (i) $7^3 = \square$ (ii) $\square^3 = 216$ (iii) $10^3 = \square$ [3 marks]
6. Find the value of $90 \times 90 \times 90$. [2 marks]
7. Find 4^3 and 40^3 . 40^3 is how many times 4^3 ? [5 marks]
8. Write the value of $(-6)^3$. [1 mark]
9. Find $(-8)^3$ and $(-20)^3$. [2 marks]
10. Find 8^3 and $(-8)^3$. How are the two answers related? [3 marks]
11. Add the cube of 9 to itself. [1 mark]
12. Find $1^3 + 2^3 + 3^3 + \dots + 7^3$. [5 marks]
13. Simplify $p^3 + (-p)^3$. [1 mark]
14. Find the value of $(-3)^3 + (-4)^3$. [2 marks]
15. What must be added to 5^3 to get 8^3 ? [2 marks]
16. What must be subtracted from 12^3 to get 9^3 ? [3 marks]
17. How much more is 10^3 than $6^3 + 7^3$? [5 marks]
18. Simplify $-b^3 - (-b)^3$. [1 mark]
19. Find the value of $2^3 - (-6)^3$. [3 marks]

20. If $a = -2$, $b = 6$ and $c = -3$, find $a^3 - b^3 + c^3$.

[5 marks]

Key sheet

Q	Answer
1	$z \times z \times z$
2	No. $7^3 = 343$, but $7 \times 3 = 21$
3	3
4	343 soap boxes
5	(i) 343 (ii) 6 (iii) 1000
6	729000
7	$4^3 = 64$, $40^3 = 64000$; 40^3 is 1000 times 4^3
8	-216
9	$(-8)^3 = -512$, $(-20)^3 = -8000$
10	$8^3 = 512$, $(-8)^3 = -512$; same number, opposite signs
11	1458
12	784
13	0
14	-91
15	387
16	999
17	441
18	0
19	224
20	-251

Solutions

1. Write z^3 as a product of z 's. [1]

z^3 means z multiplied by itself 3 times.

$$\therefore z^3 = z \times z \times z$$

Ans: $z \times z \times z$

2. Ravi says $7^3 = 7 \times 3 = 21$. Is he right? Give the correct value. [2]

$$7^3 = 7 \times 7 \times 7 = 343$$

$$7 \times 3 = 21$$

7^3 means 7 multiplied by itself 3 times, not 7 times 3.

Ans: No. $7^3 = 343$, but $7 \times 3 = 21$

3. 27 is the cube of which number? [1]

$$3 \times 3 \times 3 = 27$$

$$\therefore 27 = 3^3$$

Ans: 3

4. A carton holds soap boxes in 7 layers. Each layer has 7 rows with 7 boxes in each row. How many soap boxes are in the carton? [2]

$$\text{Number} = 7 \times 7 \times 7$$

$$= 7^3 = 49 \times 7 = 343$$

Ans: 343 soap boxes

5. Fill in the boxes using the table of cubes: (i) $7^3 = \square$ (ii) $\square^3 = 216$ (iii) $10^3 = \square$ [3]

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

$$(ii) 6 \times 6 \times 6 = 216, \text{ so the box is } 6.$$

$$(iii) 10^3 = 10 \times 10 \times 10 = 1000$$

Ans: (i) 343 (ii) 6 (iii) 1000

6. Find the value of $90 \times 90 \times 90$. [2]

$$90 \times 90 = 8100$$

$$8100 \times 90 = 729000$$

$$\therefore 90^3 = 729000$$

Ans: 729000

7. Find 4^3 and 40^3 . 40^3 is how many times 4^3 ? [5]

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

$$40 \times 40 = 1600, 1600 \times 40 = 64000$$

$$64000 \div 64 = 1000$$

So 40^3 is 1000 times 4^3 .

Ans: $4^3 = 64$, $40^3 = 64000$; 40^3 is 1000 times 4^3

8. Write the value of $(-6)^3$. [1]

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

$$= -216$$

Ans: -216

9. Find $(-8)^3$ and $(-20)^3$. [2]

$$(-8)^3 = -8^3 = -512$$

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

$$\therefore (-20)^3 = -8000$$

Ans: $(-8)^3 = -512, (-20)^3 = -8000$

10. Find 8^3 and $(-8)^3$. How are the two answers related? [3]

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

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

The two answers are the same number with opposite signs: $(-8)^3 = -8^3$.

Ans: $8^3 = 512, (-8)^3 = -512$; same number, opposite signs

11. Add the cube of 9 to itself. [1]

$$9^3 + 9^3 = 729 + 729$$

$$= 1458$$

Ans: 1458

12. Find $1^3 + 2^3 + 3^3 + \dots + 7^3$. [5]

$$1^3 + 2^3 + 3^3 + 4^3 + 5^3 + 6^3 + 7^3 = 1 + 8 + 27 + 64 + 125 + 216 + 343$$

$$= 784$$

Ans: 784

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

$$(-p)^3 = -p^3$$

$$\therefore p^3 + (-p)^3 = p^3 - p^3 = 0$$

Ans: 0

14. Find the value of $(-3)^3 + (-4)^3$. [2]

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

$$= -27 - 64$$

$$= -91$$

Ans: -91

15. What must be added to 5^3 to get 8^3 ? [2]

$$\text{Number to be added} = 8^3 - 5^3$$

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

$$= 387$$

Ans: 387

16. What must be subtracted from 12^3 to get 9^3 ? [3]

$$\text{Number} = 12^3 - 9^3$$

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

$$12^3 - 9^3 = 1728 - 729$$

$$= 999$$

Ans: 999

17. How much more is 10^3 than $6^3 + 7^3$? [5]

$$10^3 = 1000$$

$$6^3 + 7^3 = 216 + 343 = 559$$

$$\text{Difference} = 1000 - 559 = 441$$

Ans: 441

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

$$(-b)^3 = -b^3$$

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

Ans: 0

19. Find the value of $2^3 - (-6)^3$. [3]

$$2^3 - (-6)^3 = 8 - (-216)$$

$$= 8 + 216$$

$$= 224$$

Ans: 224

20. If $a = -2$, $b = 6$ and $c = -3$, find $a^3 - b^3 + c^3$. [5]

$$a^3 - b^3 + c^3 = (-2)^3 - 6^3 + (-3)^3$$

$$(-2)^3 - 6^3 + (-3)^3 = -8 - 216 + (-27)$$

$$= -8 - 216 - 27$$

$$= -251$$

Ans: -251
