EXPRESSWALA ACADEMY

Cubes and Cube Roots

Question Paper, Set 04

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 a^3 as a product. [1 mark]

2. Is 5^3 the same as 5×3? Find both values. [2 marks]

3. Find the cube of 4. [1 mark]

4. A big cube is built from small cubes, with 5 small cubes along each edge. How many small cubes are used in all? [2 marks]

5. Fill in the boxes using the table of cubes: (i) $\square^3 = 512$ (ii) $9^3 = \square$ (iii) $\square^3 = 125$ [3 marks]

6. Find the cube of 15. [2 marks]

7. Find 2^3, 20^3 and 200^3. How many zeros does 20^3 have more than 2^3, and 200^3 more than 20^3? [5 marks]

8. Without working it out, say whether $(-13)^3$ is positive or negative. Give the reason. [1 mark]

9. Find $(-6)^3$ and $(-10)^3$. [2 marks]

10. Find the cubes of -7, -9 and -20. [3 marks]

11. Add the cube of 6 to itself. [1 mark]

12. Three big cubes are built from small cubes, with 3, 4 and 6 small cubes along each edge. How many small cubes are used in all? [5 marks]

13. Find the value of $(-8)^3 + 8^3$. [1 mark]

14. Find the value of $x^3 + (-y)^3$ when $x = 6$ and $y = 2$. [2 marks]

15. What must be added to 4^3 to get 6^3? [2 marks]

16. What must be subtracted from 11^3 to get 8^3? [3 marks]

17. How much more is 9^3 than $5^3 + 6^3$? [5 marks]

18. Find $(-1)^3 \times 6^3$. [1 mark]

19. If $x = -4$ and $y = 3$, find $x^3 - y^3$. [3 marks]

20. If $a = 4$, $b = -5$ and $c = 3$, find $a^3 + b^3 + c^3$. [5 marks]

Key sheet

Q	Answer
1	$a \times a \times a$
2	No. $5^3 = 125$, but $5 \times 3 = 15$
3	64
4	125 small cubes
5	(i) 8 (ii) 729 (iii) 5
6	3375
7	8, 8000, 8000000; 3 more zeros each time
8	Negative
9	$(-6)^3 = -216$, $(-10)^3 = -1000$
10	$(-7)^3 = -343$, $(-9)^3 = -729$, $(-20)^3 = -8000$
11	432
12	307 small cubes
13	0
14	208
15	152
16	819
17	388
18	-216
19	-91
20	-34

Solutions

1. Write a^3 as a product. [1]

a^3 means a multiplied by itself 3 times.

$\therefore a^3 = a \times a \times a$

Ans: $a \times a \times a$

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2. Is 5^3 the same as 5×3? Find both values. [2]

$5^3 = 5 \times 5 \times 5 = 125$

$5 \times 3 = 15$

5^3 means 5 multiplied by itself 3 times, not 5 times 3.

Ans: No. $5^3 = 125$**, but** $5 \times 3 = 15$

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3. Find the cube of 4. [1]

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

$= 16 \times 4 = 64$

Ans: 64

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4. A big cube is built from small cubes, with 5 small cubes along each edge. How many small cubes are used in all? [2]

Number = $5 \times 5 \times 5$

$= 5^3 = 25 \times 5 = 125$

Ans: 125 **small cubes**

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5. Fill in the boxes using the table of cubes: (i) $\square^3 = 512$ (ii) $9^3 = \square$ (iii) $\square^3 = 125$ [3]

(i) $8 \times 8 \times 8 = 512$, so the box is 8.

(ii) $9^3 = 9 \times 9 \times 9 = 729$

(iii) $5 \times 5 \times 5 = 125$, so the box is 5.

Ans: (i) 8 **(ii)** 729 **(iii)** 5

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6. Find the cube of 15. [2]

$15 \times 15 = 225$

$15^3 = 225 \times 15 = 3375$

Ans: 3375

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7. Find 2^3, 20^3 and 200^3. How many zeros does 20^3 have more than 2^3, and 200^3 more than 20^3? [5]

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

$20^3 = 20 \times 20 \times 20 = 400 \times 20 = 8000$

$200^3 = 200 \times 200 \times 200 = 40000 \times 200 = 8000000$

Each time the number is multiplied by 10, its cube gets 3 more zeros.

Ans: 8, 8000, 8000000**; 3 more zeros each time**

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8. Without working it out, say whether $(-13)^3$ is positive or negative. Give the reason. [1]

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

The cube of a negative number is negative.

Ans: Negative

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9. Find $(-6)^3$ and $(-10)^3$. [2]

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

$10 \times 10 = 100$, $100 \times 10 = 1000$

$\therefore (-10)^3 = -1000$

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

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10. Find the cubes of -7, -9 and -20. [3]

$(-7)^3 = -7^3 = -(49 \times 7) = -343$

$(-9)^3 = -9^3 = -(81 \times 9) = -729$

$(-20)^3 = -20^3 = -(400 \times 20) = -8000$

Ans: $(-7)^3 = -343$, $(-9)^3 = -729$, $(-20)^3 = -8000$

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11. Add the cube of 6 to itself. [1]

$6^3 + 6^3 = 216 + 216$

$= 432$

Ans: 432

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12. Three big cubes are built from small cubes, with 3, 4 and 6 small cubes along each edge. How many small cubes are used in all? [5]

Small cubes used = $3^3 + 4^3 + 6^3$

$3^3 + 4^3 + 6^3 = 27 + 64 + 216$

$= 307$

Ans: 307 **small cubes**

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13. Find the value of $(-8)^3 + 8^3$. [1]

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

$(-8)^3 + 8^3 = 8^3 - 8^3 = 0$

Ans: 0

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14. Find the value of $x^3 + (-y)^3$ when $x = 6$ and $y = 2$. [2]

$x^3 + (-y)^3 = 6^3 + (-2)^3$

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

$= 216 - 8$

$= 208$

Ans: 208

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15. What must be added to 4^3 to get 6^3? [2]

Number to be added = $6^3 - 4^3$

$6^3 - 4^3 = 216 - 64$

$= 152$

Ans: 152

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16. What must be subtracted from 11^3 to get 8^3? [3]

Number = $11^3 - 8^3$

$11^3 = 121 \times 11 = 1331$

$11^3 - 8^3 = 1331 - 512$

$= 819$

Ans: 819

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17. How much more is 9^3 than $5^3 + 6^3$? [5]

$9^3 = 729$

$5^3 + 6^3 = 125 + 216 = 341$

Difference = $729 - 341 = 388$

Ans: 388

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18. Find $(-1)^3 \times 6^3$. [1]

$(-1)^3 = -1$, $6^3 = 216$

$-1 \times 216 = -216$

Ans: -216

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19. If $x = -4$ and $y = 3$, find $x^3 - y^3$. [3]

$x^3 - y^3 = (-4)^3 - 3^3$

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

$= -91$

Ans: -91

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20. If $a = 4$, $b = -5$ and $c = 3$, find $a^3 + b^3 + c^3$. [5]

$a^3 + b^3 + c^3 = 4^3 + (-5)^3 + 3^3$

$4^3 + (-5)^3 + 3^3 = 64 + (-125) + 27$

$= 64 - 125 + 27$

$= -34$

Ans: -34