EXPRESSWALA ACADEMY

Cubes and Cube Roots

Question Paper, Set 10

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 $t \times t \times t$ in power form. [1 mark]

2. Write $m \times m \times m \times z \times z \times z$ in power form. [2 marks]

3. Find the value of 2^3. [1 mark]

4. Is 50 the cube of a whole number? Use the table of cubes. [2 marks]

5. A cube-shaped stack of dice has 5 dice along each edge. (i) How many dice are in the top layer? (ii) How many dice are there in the whole stack? [3 marks]

6. Find 19^3 by first finding 19×19. [2 marks]

7. Three cube-shaped piles of building blocks have 14, 15 and 40 blocks along each edge. How many blocks does each pile have? [5 marks]

8. Without working it out, say whether $(-11)^3$ is positive or negative. Give the reason. [1 mark]

9. Ravi wrote $(-7)^3 = 343$. Is he right? Write the correct value. [2 marks]

10. Find $(-6)^3$ and 6^3. Which of the two is bigger, and why? [3 marks]

11. Find $8^3 + 8^3$. [1 mark]

12. Find the sum of the cubes of all the even numbers from 2 to 10. [5 marks]

13. Find the value of $(-25)^3 + 25^3$. [1 mark]

14. Find the value of $x^3 + (-y)^3$ when $x = 4$ and $y = 7$. [2 marks]

15. Ravi found $2^3 - 8^3 = 504$. Is he right? Find the correct answer. [2 marks]

16. Find $13^3 - 10^3$. [3 marks]

17. Simplify $10^3 - 3^3 - 9^3$. [5 marks]

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

19. Find the value of $(-2)^3 - (-5)^3$. [3 marks]

20. Find $10^3 - 9^3 + 8^3 - 7^3$. [5 marks]

Key sheet

Q	Answer
1	t^3
2	$m^3 \times z^3$
3	8
4	No, it lies between $3^3 = 27$ and $4^3 = 64$
5	(i) 25 (ii) 125
6	6859
7	2744, 3375, 64000 blocks
8	Negative
9	No. $(-7)^3 = -343$
10	$6^3 = 216$ is bigger than $(-6)^3 = -216$
11	1024
12	1800
13	0
14	-279
15	No. $2^3 - 8^3 = -504$
16	1197
17	244
18	$2n^3$
19	117
20	440

Solutions

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

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

Read it as 't cubed'.

Ans: t^3

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2. Write $m \times m \times m \times z \times z \times z$ in power form. [2]

$m \times m \times m = m^3$

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

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

Ans: $m^3 \times z^3$

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3. Find the value of 2^3. [1]

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

$= 4 \times 2 = 8$

Ans: 8

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4. Is 50 the cube of a whole number? Use the table of cubes. [2]

From the table: $3^3 = 27$ and $4^3 = 64$.

$27 < 50 < 64$, and no whole number lies between 3 and 4.

So 50 is not a cube.

Ans: No, it lies between $3^3 = 27$ and $4^3 = 64$

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5. A cube-shaped stack of dice has 5 dice along each edge. (i) How many dice are in the top layer? (ii) How many dice are there in the whole stack? [3]

(i) One layer has 5 rows of 5: $5 \times 5 = 25$

(ii) There are 5 layers: $25 \times 5 = 125$

So there are $5^3 = 125$ dice.

Ans: (i) 25 (ii) 125

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6. Find 19^3 by first finding 19×19. [2]

$19 \times 19 = 361$

$19^3 = 361 \times 19 = 6859$

Ans: 6859

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7. Three cube-shaped piles of building blocks have 14, 15 and 40 blocks along each edge. How many blocks does each pile have? [5]

Edge 14: $14 \times 14 = 196$, $196 \times 14 = 2744$

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

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

Ans: 2744, 3375, 64000 blocks

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8. Without working it out, say whether $(-11)^3$ is positive or negative. Give the reason. [1]

$(-11)^3 = -11^3$

The cube of a negative number is negative.

Ans: Negative

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9. Ravi wrote $(-7)^3 = 343$. Is he right? Write the correct value. [2]

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

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

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

Ans: No. $(-7)^3 = -343$

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10. Find $(-6)^3$ and 6^3. Which of the two is bigger, and why? [3]

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

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

216 is positive and -216 is negative, so 6^3 is bigger.

Ans: $6^3 = 216$ **is bigger than** $(-6)^3 = -216$

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11. Find $8^3 + 8^3$. [1]

$8^3 + 8^3 = 512 + 512$

$= 1024$

Ans: 1024

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12. Find the sum of the cubes of all the even numbers from 2 to 10. [5]

$2^3 + 4^3 + 6^3 + 8^3 + 10^3 = 8 + 64 + 216 + 512 + 1000$

$= 1800$

Ans: 1800

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13. Find the value of $(-25)^3 + 25^3$. [1]

$(-25)^3 = -25^3$

$(-25)^3 + 25^3 = 25^3 - 25^3 = 0$

Ans: 0

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14. Find the value of $x^3 + (-y)^3$ when $x = 4$ and $y = 7$. [2]

$x^3 + (-y)^3 = 4^3 + (-7)^3$

$4^3 + (-7)^3 = 64 + (-343)$

$= 64 - 343$

$= -279$

Ans: -279

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15. Ravi found $2^3 - 8^3 = 504$. Is he right? Find the correct answer. [2]

$2^3 - 8^3 = 8 - 512$

We take away the bigger number 512 from the smaller number 8, so the answer is negative.

$8 - 512 = -504$

Ravi subtracted the other way round; the correct answer is -504.

Ans: No. $2^3 - 8^3 = -504$

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16. Find $13^3 - 10^3$. [3]

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

$13^3 - 10^3 = 2197 - 1000$

$= 1197$

Ans: 1197

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17. Simplify $10^3 - 3^3 - 9^3$. [5]

$10^3 - 3^3 - 9^3 = 1000 - 27 - 729$

$= 244$

Ans: 244

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

$(-n)^3 = -n^3$

$n^3 - (-n^3) = n^3 + n^3 = 2n^3$

Ans: $2n^3$

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19. Find the value of $(-2)^3 - (-5)^3$. [3]

$(-2)^3 - (-5)^3 = -8 - (-125)$

$= -8 + 125$

$= 117$

Ans: 117

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20. Find $10^3 - 9^3 + 8^3 - 7^3$. [5]

$10^3 - 9^3 + 8^3 - 7^3 = 1000 - 729 + 512 - 343$

$= 440$

Ans: 440