

Class : IXTH

Date :

Subject : MATHS

DPP No. : 2

EXPLORING ALGEBRAIC IDENTITIES**Multiple Choice Questions**

- Q 1. $(x + 1)^3$ is the same as:
(a) $x^3 + 1$ (b) $(x^2 + 1)(x + 1)$
(c) $(x + 1)(x + 1)^2$ (d) $x^3 + 3x^2 + 1$
- Q 2. Given that $100^3 = a^3$, which expression gives the value of the product 103×108 ?
(a) $a^2 + 11a + 24$ (b) $a^2 + 24a + 11$
(c) $a^2 + 24a + 24$ (d) $a^2 + 11a + 11$
- Q 3. The factors of $2\sqrt{2}x^3 + y^3$ are:
(a) $(\sqrt{2}x + y)$ and $(2x^2 - \sqrt{2}xy + y^2)$
(b) $(\sqrt{2}x + y)$ and $(2x^2 + \sqrt{2}xy + y^2)$
(c) $(\sqrt{2}x - y)$ and $(2x^2 + \sqrt{2}xy + y^2)$
(d) $(\sqrt{2}x - y)$ and $(2x^2 - \sqrt{2}xy + y^2)$
- Q 4. Which of these is obtained by factorising the polynomial $10x^2 - 9x + 2$?
(a) $(2x - 1)(5x - 2)$ (b) $(2x - 1)(5x + 2)$
(c) $(2x + 1)(5x + 2)$ (d) $(2x + 1)(5x - 2)$
- Q 5. If area of a rectangle is $6x^2 + 5x - 6$, then its possible dimensions are:
(a) $(2x - 3), (3x - 2)$ (b) $(2x + 3), (3x - 2)$
(c) $(2x - 3), (3x + 2)$ (d) $(2x + 3), (3x + 2)$
- Q 6. If $x^2 + kx + 6 = (x + 2)(x + 3)$, for all x , then the value of k is:
(a) 1 (b) -1
(c) 5 (d) 3

Short Answer Questions

- Q 7. Evaluate $(4x + 2y)^3 + (4x - 2y)^3$ using suitable identities.
- Q 8. The area of a rectangular cardboard sheet is $(3x^2 + x - 2)$ square units. If width is $(1 + x)$ units, then what is the length of the cardboard?



Q9. Expand using suitable identities:

(i) $(2x + 3)^3$

(ii) $(5p - 3q)^3$

(iii) $\left(\frac{3}{2}x + 4\right)^3$

(iv) $\left(4 - \frac{1}{3x}\right)^3, x \neq 0$

Q 10. Simplify using suitable identities: (i) $(11.2)^3$ (ii) $(104)^3$

Q 11. Factorise the following expressions using suitable identities:

(i) $64m^3 - 343n^3$

(ii) $250x^3 - 432y^3$

Q 12. Find the following products using suitable identities:

(i) $(4x - 5y)(16x^2 + 20xy + 25y^2)$

(ii) $\left(\frac{x}{2} + 2y\right)\left(\frac{x^2}{4} - xy + 4y^2\right)$

(iii) $\left(\frac{3}{x} - \frac{5}{y}\right)\left(\frac{9}{x^2} + \frac{25}{y^2} + \frac{15}{xy}\right)$

(iv) $\left(3 + \frac{5}{x}\right)\left(9 - \frac{15}{x} + \frac{25}{x^2}\right)$

Q 13. Simplify using suitable identities:

(i) $x^3 - 8y^3 + 27z^3 + 18xyz$

(ii) $27x^3 - y^3 - z^3 - 9xyz$

(iii) $8x^3 - 125y^3 + 180xy + 216$

(iv) $3\sqrt{3}a^3 - b^3 - 5\sqrt{5}c^3 - 3\sqrt{5}abc$

(v) $2\sqrt{2}a^3 + 16\sqrt{2}b^3 + c^3 - 12abc$

Q 14. Evaluate using suitable identities:

(i) $\frac{86 \times 86 \times 86 + 14 \times 14 \times 14}{86 \times 86 - 86 \times 14 + 14 \times 14}$

(ii) $\frac{1.2 \times 1.2 \times 1.2 - 0.2 \times 0.2 \times 0.2}{1.2 \times 1.2 + 1.2 \times 0.2 + 0.2 \times 0.2}$

Q 15. Factorise $x^2 + 4x + 3$ using algebra tiles.

Q 16. If $a + b = 3$ and $ab = 2$, find the value of $a^3 + b^3$.

Q 17. Factorise each of the following expressions by splitting the middle term:

(i) $m^2 - 7m - 30$

(ii) $7x^2 + 25x - 12$

(iii) $1 - 18y - 63y^2$

(iv) $x(12x + 7) - 10$

Q 18. Find possible length and breadth of the rectangle whose area is $35y^2 + 8y - 16$.

Q 19. What are the possible expressions for the dimensions of the cuboid whose volume is,

$12ky^2 + 8ky - 20k$.



Q 20. Factorise each of the following expressions by splitting the middle term:

(i) $7(x - 2y)^2 - 25(x - 2y) + 12$

(ii) $2(x + y)^2 + 9(x + y) - 5$

LONG ANSWER QUESTION

Q 21. Simplify the following:

(i) $\left(x + \frac{2}{x}\right)^3 + \left(x - \frac{2}{x}\right)^3$

(ii) $\left(\frac{x}{3} + \frac{y}{5}\right)^3 - \left(\frac{x}{3} - \frac{y}{5}\right)^3$

Q 22. The product of the present ages of a father and his daughter is 540 . If the father is 21 years older than his daughter, find their present ages.

Q23. Simplify the following rational expressions:

(i) $\frac{3x^2 - 18x + 24}{2x^2 - 6x - 8}$

(ii) $\frac{(x^2 + x - 2)(x^2 + x - 12)}{(x^2 - 2x - 3)(x^2 + 3x - 4)}$

Q 24. The length of a rectangular field is 6 metres more than its breadth. If the area of the field is 135 sq. metres, find the length and breadth of the rectangular field.

ANSWER KEY

1. (c) 2.(a) 3.(a) 4.(a) 5.(b) 6.(c)

7. $128x^3 + 96xy^2$

8. $(3x - 2)$ units

9. (i) $8x^3 + 36x^2 + 54x + 27$

(ii) $125p^3 - 27q^3 - 225p^2q + 135pq^2$

(iii) $\frac{27}{8}x^3 + 27x^2 + 72x + 64$

(iv) $64 - \frac{16}{x} + \frac{4}{3x^2} - \frac{1}{27x^3}$

10. (i) 1404.928

(ii) 1124864

11. (i) $(4m - 7n)(16m^2 + 28mn + 49n^2)$ (ii) $2(5x - 6y)(25x^2 + 30xy + 36y^2)$

12. (i) $64x^3 - 125y^3$

(ii) $\frac{x^3}{8} + 8y^3$



- (iii) $\frac{27}{x^3} - \frac{125}{y^3}$
 (iv) $27 + \frac{125}{x^3}$
13. (i) $(x - 2y + 3z)(x^2 + 4y^2 + 9z^2 + 2xy + 6yz - 3zx)$
 (ii) $(3x - y - z)(9x^2 + y^2 + z^2 + 3xy - yz + 3zx)$
 (iii) $(2x - 5y + 6)(4x^2 + 25y^2 + 36 + 10xy + 30y - 12x)$
 (iv) $(\sqrt{3}a - b - \sqrt{5}c)(3a^2 + b^2 + 5c^2 + \sqrt{3}ab - \sqrt{5}bc + \sqrt{15}ca)$
 (v) $(\sqrt{2}a + 2\sqrt{2}b + c)(2a^2 + 8b^2 + c^2 - 4ab - 2\sqrt{2}bc - \sqrt{2}ca)$
14. (i) 100
 (ii) 1
15. $(x + 3)(x + 1)$
16. 9
17. (i) $(m - 10)(m + 3)$
 (ii) $(x + 4)(7x - 3)$
 (iii) $(1 - 21y)(1 + 3y)$
 (iv) $(4x + 5)(3x - 2)$
18. $(5y + 4)$ units and $(7y - 4)$ units
19. $4k$ units, $(y - 1)$ units and $(3y + 5)$ units
20. (i) $(x - 2y - 3)(7x - 14y - 4)$
 (ii) $(x + y + 5)(2x + 2y - 1)$
21. (i) $2\left(x^3 + \frac{12}{x}\right)$
 (ii) $2\left(\frac{y^3}{125} + \frac{x^2y}{15}\right)$
22. Daughter's age = 15 years, father's age = 36 years
23. (i) $\frac{3x-6}{2x+2}$ (ii) $\frac{x+2}{x+1}$
24. Breadth = 9 m, Length = 15 m



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