

6. सरावासाठी अधिक प्रश्न

1. सोपे रूप द्या.

$$(1) \frac{a^2(a^2-b^2)}{a^2+2ab+b^2} \div \frac{a^3(a-b)}{a^2+ab}$$

$$\text{उकल : } \frac{a^2(a^2-b^2)}{a^2+2ab+b^2} \div \frac{a^3(a-b)}{a^2+ab}$$

$$= \frac{a^2(a^2-b^2)}{a^2+2ab+b^2} \times \frac{a^2+ab}{a^3(a-b)}$$

$$= \frac{a^2(a+b)(a-b)}{(a+b)^2} \times \frac{a(a+b)}{a^3(a-b)}$$

$$\dots \because [a^2 + 2ab + b^2 = (a+b)^2] \text{ आणि}$$

$$[(a^2 - b^2) = (a+b)(a-b)]$$

$$= 1$$

$$(2) \frac{x^2-3x+2}{x^2+x-2} \div \frac{x^2-4}{x^2+6x+8}$$

$$\text{उकल : } \frac{x^2-3x+2}{x^2+x-2} \div \frac{x^2-4}{x^2+6x+8}$$

$$= \frac{x^2-3x+2}{x^2+x-2} \times \frac{x^2+6x+8}{x^2-4} \dots\dots(I)$$

उदाहरणात दिलेल्या राशींचे अवयव पाडू

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

$$= x^2 - 2x - x + 2$$

$$= x(x - 2) - 1(x - 2)$$

$$= (x - 2)(x - 1)$$

$$(ii) \ x^2 + x - 2$$

$$= x^2 + 2x - x - 2$$

$$= x(x + 2) - 1(x + 2)$$

$$= (x + 2)(x - 1)$$

$$(iii) \ x^2 + 6x + 8$$

$$= x^2 + 4x + 2x + 8$$

$$= x(x + 4) + 2(x + 4)$$

$$= (x + 4)(x + 2)$$

$$(iv) \ x^2 - 4$$

$$= (x + 2)(x - 2)$$

समीकरण (I) मध्ये मूळ राशींच्या जागी त्यांचे अवयव लिहू.

$$= \frac{(x-2)(x-1)}{(x+2)(x-1)} \times \frac{(x+4)(x+2)}{(x+2)(x-2)}$$

$$= \frac{x+4}{x+2}$$

$$\therefore \frac{x^2-3x+2}{x^2+x-2} \div \frac{x^2-4}{x^2+6x+8} = \frac{x+4}{x+2}$$

$$(3) \left[\frac{m^2-mn}{mn-n^2} \times \frac{m^2+5mn+6n^2}{(m-n)^2} \right] \times \frac{m^2n+mn^2}{m^2+3mn+2n^2}$$

$$\text{उकल: } \left[\frac{m^2-mn}{mn-n^2} \times \frac{m^2+5mn+6n^2}{(m-n)^2} \right] \times \frac{m^2n+mn^2}{m^2+3mn+2n^2}$$

उदाहरणात दिलेल्या राशींचे अवयव पाडू

$$(i) \quad m^2 + 5mn + 6n^2$$

$$= m^2 + 3mn + 2mn + 6n^2$$

$$= m(m + 3n) + 2n(m + 3n)$$

$$= (m + 3n) + (m + 2n)$$

$$(ii) \quad m^2 + 3mn + 2n^2$$

$$= m^2 + 2mn + 1mn + 2n^2$$

$$= m(m + 2n) + n(m + 2n)$$

$$= (m + 2n) + (m + n)$$

उदाहरणातील मूळ राशींच्या जागी त्यांचे अवयव लिहू

$$\left[\frac{m^2-mn}{mn-n^2} \times \frac{m^2+5mn+6n^2}{(m-n)^2} \right] \times \frac{m^2n+mn^2}{m^2+3mn+2n^2}$$

$$\begin{aligned}
&= \left[\frac{m(m-n)}{n(m-n)} \times \frac{(m+3n)(m+2n)}{(m-n)^2} \right] \times \frac{mn(m+n)}{(m+2n)(m+n)} \\
&= \frac{m}{n} \times \frac{mn(m+3n)}{(m-n)^2} \\
&= \frac{m^2(m+3n)}{(m-n)^2} \\
\therefore \left[\frac{m^2-mn}{mn-n^2} \times \frac{m^2+5mn+6n^2}{(m-n)^2} \right] \times \frac{m^2n+mn^2}{m^2+3mn+2n^2} &= \frac{m^2(m+3n)}{(m-n)^2}
\end{aligned}$$

$$(4) \left[\frac{x^2+x-12}{x^2-5x+6} \div \frac{x^2-x-20}{x^2-25} \right] \div \frac{x^2+2x-15}{x-2}$$

$$\text{उकल : } \left[\frac{x^2+x-12}{x^2-5x+6} \div \frac{x^2-x-20}{x^2-25} \right] \div \frac{x^2+2x-15}{x-2}$$

उदाहरणात दिलेल्या राशींचे अवयव पाडू

$$(i) x^2 + x - 12$$

$$= x^2 + 4x - 3x - 12$$

$$= x(x+4) - 3(x+4)$$

$$= (x+4)(x-3)$$

$$(ii) x^2 - 5x + 6$$

$$= x^2 - 3x - 2x + 6$$

$$= x(x-3) - 2(x-3)$$

$$= (x - 3)(x - 2)$$

$$\text{(iii)} \quad x^2 - x - 20$$

$$= x^2 - 5x + 4x - 20$$

$$= x(x - 5) + 4(x - 5)$$

$$= (x - 5)(x + 4)$$

$$\text{(iv)} \quad x^2 - 25$$

$$= (x + 5)(x - 5)$$

$$\text{(v)} \quad x^2 + 2x - 15$$

$$= x^2 + 5x - 3x - 15$$

$$= x(x + 5) - 3(x + 5)$$

$$= (x + 5)(x - 3)$$

उदाहरणातील मूळ राशींच्या जागी त्यांचे अवयव लिहू.

$$\begin{aligned} & \left[\frac{x^2 + x - 12}{x^2 - 5x + 6} \div \frac{x^2 - x - 20}{x^2 - 25} \right] \div \frac{x^2 + 2x - 15}{x - 2} \\ &= \left[\frac{(x + 4)(x - 3)}{(x - 3)(x - 2)} \div \frac{(x - 5)(x + 4)}{(x + 5)(x - 5)} \right] \div \frac{(x + 5)(x - 3)}{(x - 2)} \\ &= \left[\frac{(x + 4)}{(x - 2)} \div \frac{(x + 4)}{(x + 5)} \right] \div \frac{(x + 5)(x - 3)}{(x - 2)} \end{aligned}$$

$$= \left[\frac{(x+4)}{(x-2)} \times \frac{(x+5)}{(x+4)} \right] \times \frac{(x-2)}{(x+5)(x-3)}$$

$$= \frac{(x+5)}{(x-2)} \times \frac{(x-2)}{(x+5)(x-3)}$$

$$= \frac{1}{x-3}$$

$$\therefore \left[\frac{x^2+x-12}{x^2-5x+6} \div \frac{x^2-x-20}{x^2-25} \right] \div \frac{x^2+2x-15}{x-2} = \frac{1}{x-3}$$

$$(5) \frac{x(x^2-y^2)}{a^2+3ab+2b^2} \div \frac{x^2+xy}{a+2b}$$

$$\text{उकल : } \frac{x(x^2-y^2)}{a^2+3ab+2b^2} \div \frac{x^2+xy}{a+2b}$$

उदाहरणात दिलेल्या राशींचे अवयव पाडू

$$(i) (x^2 - y^2)$$

$$= (x+y)(x-y)$$

$$(ii) a^2 + 3ab + 2b^2$$

$$= a^2 + 2ab + ab + 2b^2$$

$$= a(a+2b) + b(a+2b)$$

$$= (a+2b) + (a+b)$$

उदाहरणातील मूळ राशींच्या जागी त्यांचे अवयव लिहू

$$\begin{aligned}
& \frac{x(x^2 - y^2)}{a^2 + 3ab + 2b^2} \div \frac{x^2 + xy}{a + 2b} \\
&= \frac{x(x + y)(x - y)}{(a + 2b)(a + b)} \div \frac{x(x + y)}{(a + 2b)} \\
&= \frac{x(x + y)(x - y)}{(a + 2b)(a + b)} \times \frac{(a + 2b)}{x(x + y)} \\
&= \frac{x - y}{a + b} \\
&\therefore \frac{x(x^2 - y^2)}{a^2 + 3ab + 2b^2} \div \frac{x^2 + xy}{a + 2b} = \frac{x - y}{a + b}
\end{aligned}$$

$$(6) \frac{x + 2y}{3x + 3y} \times \frac{x + y}{2x + 4y}$$

$$\begin{aligned}
\text{उकल : } & \frac{x + 2y}{3x + 3y} \times \frac{x + y}{2x + 4y} \\
&= \frac{x + 2y}{3(x + y)} \times \frac{x + y}{2(x + 2y)} \\
&= \frac{1}{6}
\end{aligned}$$

$$\therefore \frac{x + 2y}{3x + 3y} \times \frac{x + y}{2x + 4y} = \frac{1}{6}$$

$$(7) \frac{6y^2 + 7y - 3}{6y^2 + 11y + 3}$$

$$\text{उकल : } \frac{6y^2 + 7y - 3}{6y^2 + 11y + 3}$$

$$= \frac{6y^2 + 9y - 2y - 3}{6y^2 + 9y + 2y + 3}$$

$$= \frac{3y(2y + 3) - 1(2y + 3)}{3y(2y + 3) + 1(2y + 3)}$$

$$= \frac{(2y + 3)(3y - 1)}{(2y + 3)(3y + 1)}$$

$$= \frac{3y - 1}{3y + 1}$$

$$\therefore \frac{6y^2 + 7y - 3}{6y^2 + 11y + 3} = \frac{3y - 1}{3y + 1}$$

$$(8) \frac{a^3 + 8}{a^2 - 16} \times \frac{a^2 - 4a}{a^2 - 2a + 4}$$

$$\text{उकल : } \frac{a^3 + 8}{a^2 - 16} \times \frac{a^2 - 4a}{a^2 - 2a + 4}$$

$$= \frac{(a+2)(a^2 - 2a + 4)}{(a+4)(a-4)} \times \frac{a(a-4)}{(a^2 - 2a + 4)}$$

$$= \frac{a(a+2)}{a+4}$$

$$\therefore \frac{a^3+8}{a^2-16} \times \frac{a^2-4a}{a^2-2a+4} = \frac{a(a+2)}{a+4}$$

2. अवयव पाडा.

$$(1) 5x^2y^2 - 25xy - 180$$

उकल :

$$5x^2y^2 - 25xy - 180 \quad ; \quad 5 \times (-180) = -900$$

$$a + b = -25, a \times b = -900$$

$$= 5x^2y^2 - 45xy + 20xy - 180 \quad \begin{array}{cc} & \wedge \\ -45 & +20 \end{array}$$

$$= 5xy (xy - 9) + 20 (xy - 9)$$

$$= (xy - 9)(5xy + 20)$$

$$= (xy - 9) 5 (xy + 4)$$

$$= 5 (xy - 9)(xy + 4)$$

$$\therefore 5x^2y^2 - 25xy - 180 = 5 (xy - 9)(xy + 4)$$

$$(2) 12x^2 - 29xy + 14y^2$$

उकल :

$$\begin{aligned}
 &12x^2 - 29xy + 14y^2 && ; \quad 12 \times 14 = 168 \\
 &a + b = -29, a \times b = 168 && \begin{array}{c} \diagup \quad \diagdown \\ -21 \quad -8 \end{array} \\
 &= 12x^2 - 21xy - 8xy + 14y^2 \\
 &= 3x(4x - 7y) - 2y(4x - 7y) \\
 &= (4x - 7y)(3x - 2y) \\
 &\therefore 12x^2 - 29xy + 14y^2 = (4x - 7y)(3x - 2y)
 \end{aligned}$$

$$(3) 24a^2 - 65ab - 21b^2$$

उकल :

$$\begin{aligned}
 &24a^2 - 65ab - 21b^2 && ; \quad 24 \times (-21) = -504 \\
 &a + b = -65, a \times b = -504 && \begin{array}{c} \diagup \quad \diagdown \\ -56 \quad +9 \end{array} \\
 &= 24a^2 - 56ab + 9ab - 21b^2 \\
 &= 8a(3a - 7b) + 3b(3a - 7b) \\
 &= (8a + 3b)(3a - 7b) \\
 &\therefore 24a^2 - 65ab - 21b^2 = (8a + 3b)(3a - 7b)
 \end{aligned}$$

$$(4) 7y^2 + 25yz + 12z^2$$

उकल :

$$\begin{aligned}
 & 7y^2 + 25yz + 12z^2 \quad ; \quad 7 \times 12 = 84 \\
 & a + b = 25, a \times b = 84 \\
 & = 7y^2 + 21yz + 4yz + 12z^2 \\
 & = 7y(y + 3z) + 4z(y + 3z) \\
 & = (y + 3z)(7y + 4z) \\
 & \therefore 7y^2 + 25yz + 12z^2 = (y + 3z)(7y + 4z)
 \end{aligned}$$

$$\begin{array}{c}
 84 \\
 \swarrow \quad \searrow \\
 +21 \quad +4
 \end{array}$$

3. सोपे रुप द्या.

$$(1) (ab + cd)^3 - a^3b^3 - c^3d^3$$

उकल :

$$\begin{aligned}
 & (ab + cd)^3 - a^3b^3 - c^3d^3 \\
 & (a + b)^3 = a^3 + b^3 + 3a^2b + 3ab^2 \quad \dots(\text{सूत्र}) \\
 & = [(ab)^3 + 3 \times (ab)^2 \times (cd) + 3 \times (ab) \times (cd)^2 + (cd)^3] - a^3b^3 - c^3d^3 \\
 & = a^3b^3 + 3 \times a^2b^2 \times cd + 3 \times ab \times c^2d^2 + c^3d^3 - a^3b^3 - c^3d^3 \\
 & = a^3b^3 + 3a^2b^2cd + 3abc^2d^2 + c^3d^3 - a^3b^3 - c^3d^3
 \end{aligned}$$

$$\therefore (ab + cd)^3 - a^3b^3 - c^3d^3 = 3a^2b^2cd + 3abc^2d^2$$

$$(2) (3x - 4y)^3 - (27x^3 - 64y^3)$$

उकल :

$$(3x - 4y)^3 - (27x^3 - 64y^3)$$

$$(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 \quad \dots(\text{सूत्र})$$

$$= [(3x)^3 - 3 \times (3x)^2 \times (4y) + 3 \times (3x) \times (4y)^2 - (4y)^3] - 27x^3 + 64y^3$$

$$= 27x^3 - 3 \times 9x^2 \times 4y + 9x \times 16y^2 - 64y^3 - 27x^3 + 64y^3$$

$$= 27x^3 - 108x^2y + 144xy^2 - 64y^3 - 27x^3 + 64y^3$$

$$= 144xy^2 - 108x^2y$$

$$= 36xy(4y - 3x)$$

$$\therefore (3x - 4y)^3 - (27x^3 - 64y^3) = 36xy(4y - 3x)$$

$$(3) (x - 2y)^3 - (8y)^3$$

उकल :

$$(x - 2y)^3 - (8y)^3$$

$$(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 \quad \dots(\text{सूत्र})$$

$$= [x - 2y - 8y][(x - 2y)^2 + (x - 2y)(8y) + (8y)^2]$$

$$= [x - 10y][x^2 - 4xy + 4y^2 + 8xy - 16y^2 + 64y^2]$$

$$= (x - 10y)(x^2 + 4xy + 52y^2)$$

$$\therefore (x - 2y)^3 - (8y)^3 = (x - 10y)(x^2 + 4xy + 52y^2)$$

$$(4) (5x + 4y)^3 - (5x - 4y)^3$$

उकल :

$$(5x + 4y)^3 - (5x - 4y)^3$$

$$a^3 - b^3 = (a - b) (a^2 + ab + b^2) \dots(\text{सूत्र})$$

$$= [(5x + 4y) - (5x - 4y)][(5x + 4y)^2 + (5x + 4y)(5x - 4y) + (5x - 4y)^2]$$

$$= 8y [25x^2 + 40xy + 16y^2 + 25x^2 - 16y^2 + 25x^2 - 40xy + 16y^2]$$

$$= 8y [25x^2 + 25x^2 + 25x^2 + 16y^2]$$

$$= 8y (75x^2 + 16y^2)$$

$$= 600x^2y + 128y^3$$

$$\therefore (5x + 4y)^3 - (5x - 4y)^3 = 600x^2y + 128y^3$$

$$(5) (p + q)^3 - (p + 2q)^3$$

उकल :

$$(p + q)^3 - (p + 2q)^3$$

$$a^3 - b^3 = (a - b) (a^2 + ab + b^2) \dots(\text{सूत्र})$$

$$= [(p + q) - (p + 2q)][(p + q)^2 + (p + q)(p + 2q) + (p + 2q)^2]$$

$$= (-q) [p^2 + 2pq + q^2 + p^2 + 2pq + pq + 2q^2 + p^2 + 4pq + 4q^2]$$

$$= (-q) [3p^2 + 2pq + 2pq + 4pq + pq + q^2 + 2q^2 + 4q^2]$$

$$= (-q) [3p^2 + 9pq + 7q^2]$$

$$= -3p^2q - 9pq^2 - 7q^3$$

$$\therefore (p + q)^3 - (p + 2q)^3 = -3p^2q - 9pq^2 - 7q^3$$

$$(6) \frac{(m^2 - mn + n^2)}{(m+n)} \times \frac{(m^2 + 2mn + n^2)}{(m^3 + n^3)}$$

उकल :

$$\begin{aligned} &= \frac{(m^2 - mn + n^2)}{(m+n)} \times \frac{(m^2 + 2mn + n^2)}{(m^3 + n^3)} \\ &= \frac{m^2 - mn + n^2}{m+n} \times \frac{(m+n)^2}{(m+n)(m^2 - mn + n^2)} \\ &= 1 \\ \therefore \frac{(m^2 - mn + n^2)}{(m+n)} \times \frac{(m^2 + 2mn + n^2)}{(m^3 + n^3)} &= 1 \end{aligned}$$

$$(7) \frac{8p^3 - 27q^3}{4p^2 - 9q^2} \times \frac{1}{(4p^2 + 6pq + 9q^2)}$$

उकल :

$$\begin{aligned} &= \frac{8p^3 - 27q^3}{4p^2 - 9q^2} \times \frac{1}{(4p^2 + 6pq + 9q^2)} \\ &= \frac{(2p - 3q)(4p^2 + 6pq + 9q^2)}{(2p + 3q)(2p - 3q)} \times \frac{1}{4p^2 + 6pq + 9q^2} \\ &= \frac{1}{2p + 3q} \\ \therefore \frac{8p^3 - 27q^3}{4p^2 - 9q^2} \times \frac{1}{(4p^2 + 6pq + 9q^2)} &= \frac{1}{2p + 3q} \end{aligned}$$

$$(8) \frac{3a^2 - 3ab}{ab - b^2} \times \frac{ab^2 + b^3}{9a^2 - 9b^2}$$

उकल :

$$\begin{aligned} &= \frac{3a^2 - 3ab}{ab - b^2} \times \frac{ab^2 + b^3}{9a^2 - 9b^2} \\ &= \frac{3a(a - b)}{b(a - b)} \times \frac{b^2(a + b)}{9(a^2 - b^2)} \\ &= \frac{3a(a - b)}{b(a - b)} \times \frac{b^2(a + b)}{9(a + b)(a - b)} \\ &= \frac{3a}{b} \times \frac{b^2}{9(a - b)} \\ &= \frac{ab}{3(a - b)} \\ \therefore \frac{3a^2 - 3ab}{ab - b^2} \times \frac{ab^2 + b^3}{9a^2 - 9b^2} &= \frac{ab}{3(a - b)} \end{aligned}$$

4. अवयव पाडा.

$$(1) a^2 + a - 72$$

उकल :

$$\begin{aligned} &a^2 + a - 72 \\ a + b &= +1, a \times b = -72 \\ &= a^2 + 9a - 8a - 72 \\ &= a(a + 9) - 8(a + 9) \\ &= (a + 9)(a - 8) \\ \therefore a^2 + a - 72 &= (a + 9)(a - 8) \end{aligned}$$



$$(2) x^2 - 12x - 64$$

उकल :

$$x^2 - 12x - 64$$

$$a + b = -12, a \times b = -64$$

$$= x^2 - 16x + 4x - 64$$

$$= x(x - 16) + 4(x - 16)$$

$$= (x - 16)(x + 4)$$

$$\therefore x^2 - 12x - 64 = (x - 16)(x + 4)$$

$$\begin{array}{c} -64 \\ \swarrow \quad \searrow \\ -16 \quad +4 \end{array}$$

$$(3) y^3 - 216$$

उकल :

$$y^3 - 216$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2) \quad \dots\dots\dots(\text{सूत्र})$$

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

$$= (y - 6) + (y^2 + y \times 6 + 6^2)$$

$$= (y - 6)(y^2 + 6y + 36)$$

$$\therefore y^3 - 216 = (y - 6)(y^2 + 6y + 36)$$

$$(4) 125x^3 + 343y^3$$

उकल :

$$125x^3 + 343y^3$$

$$a^3 + b^3 = (a + b) (a^2 - ab + b^2) \dots\dots\dots(\text{सूत्र})$$

$$= (5x)^3 + (7y)^3$$

$$= (5x + 7y) + (25x^2 - (5x) \times (7y) + 49y^2)$$

$$= (5x + 7y)(25x^2 - 35xy + 49y^2)$$

$$\therefore 125x^3 + 343y^3 = (5x + 7y)(25x^2 - 35xy + 49y^2)$$

$$(5) \ 54x^3 - 16y^3$$

उकल :

$$54x^3 - 16y^3$$

$$= 2(27x^3 - 8y^3)$$

$$a^3 - b^3 = (a - b) (a^2 + ab + b^2) \dots\dots\dots(\text{सूत्र})$$

$$= 2[(3x)^3 - (2y)^3]$$

$$= 2(3x - 2y) [(3x)^2 + (3x) \times (2y) + (2y)^2]$$

$$= 2(3x - 2y) (9x^2 + 6xy + 4y^2)$$

$$\therefore 54x^3 - 16y^3 = 2(3x - 2y)(9x^2 + 6xy + 4y^2)$$

$$(6) \ 64x^3 + \frac{27}{512x^3}$$

उकल :

$$64x^3 + \frac{27}{512x^3}$$

$$= (4x)^3 + \left(\frac{3}{8x}\right)^3$$

$$a^3 + b^3 = (a + b) (a^2 - ab + b^2) \dots\dots\dots(\text{सूत्र})$$

$$= \left(4x + \frac{3}{8x}\right) \left[(4x)^2 - (4x) \times \left(\frac{3}{8x}\right) + \left(\frac{3}{8x}\right)^2\right]$$

$$= \left(4x + \frac{3}{8x}\right) \left(16x^2 - \frac{3}{2} + \frac{9}{64x^2}\right)$$

$$\therefore 64x^3 + \frac{27}{512x^3} = \left(4x + \frac{3}{8x}\right) \left(16x^2 - \frac{3}{2} + \frac{9}{64x^2}\right)$$

$$(7) 32a^3 - \frac{108}{b^3}$$

उकल :

$$32a^3 - \frac{108}{b^3}$$

$$= 4 \left[8a^3 - \frac{27}{b^3}\right] \dots\dots (4 \text{ हा सामाईक अवयव काढून})$$

$$= 4 \left[(2a)^3 - \left(\frac{3}{b}\right)^3\right]$$

$$a^3 - b^3 = (a - b) (a^2 + ab + b^2) \dots\dots\dots(\text{सूत्र})$$

$$= 4 \left[\left(2a - \frac{3}{b}\right) \left((2a)^2 + (2a) \times \left(\frac{3}{b}\right) + \left(\frac{3}{b}\right)^2\right)\right]$$

$$= 4 \left[\left(2a - \frac{3}{b}\right) \left(4a^2 + \frac{6a}{b} + \frac{9}{b^2}\right)\right]$$

$$\therefore 32a^3 - \frac{108}{b^3} = 4 \left[\left(2a - \frac{3}{b}\right) \left(4a^2 + \frac{6a}{b} + \frac{9}{b^2}\right)\right]$$

$$(8) 1 + \frac{y^3}{729}$$

उकल :

$$1 + \frac{y^3}{729}$$

$$= (1)^3 + \left(\frac{y}{9}\right)^3$$

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2) \dots\dots\dots(\text{सूत्र})$$

$$= \left(1 + \frac{y}{9}\right) \left[(1)^2 - (1)\left(\frac{y}{9}\right) + \left(\frac{y}{9}\right)^2\right]$$

$$= \left(1 + \frac{y}{9}\right) \left(1 - \frac{y}{9} + \frac{y^2}{81}\right)$$

$$\therefore 1 + \frac{y^3}{729} = \left(1 + \frac{y}{9}\right) \left(1 - \frac{y}{9} + \frac{y^2}{81}\right)$$

5. खालील कृती पूर्ण करा.

$$(1) M^2 - 33M + 230$$

$$= M^2 - \boxed{} M - \boxed{} M + 230$$

$$= M(M - \boxed{}) - \boxed{}(M - 23)$$

$$= (M - \boxed{})(M - \boxed{})$$

उत्तर :

$$M^2 - 33M + 230$$

$$= M^2 - \boxed{23} M - \boxed{10} M + 230$$

$$= M(M - \boxed{23}) - \boxed{10}(M - 23)$$

$$= (M - \boxed{23}) (M - \boxed{10})$$

6. खालील कृती पूर्ण करा.

$$(1) 512 + P^3$$

$$= \boxed{} + P^3$$

$$= (\boxed{} + P) [\boxed{} - \boxed{} \times (P) + P^2]$$

$$= (\boxed{} + P) (\boxed{} - \boxed{}P + P^2)$$

उत्तर :

$$512 + P^3$$

$$= \boxed{(8)^3} + P^3$$

$$= (\boxed{8} + P) [\boxed{(8)^2} - \boxed{8} \times (P) + P^2]$$

$$= (\boxed{8} + P) (\boxed{64} - \boxed{8}P + P^2)$$

7. खालील कृती पूर्ण करा.

$$(1) N^3 - (N - 2)^3$$

$$= [N - (\boxed{})] [N^2 + N \times \boxed{} + \boxed{}]$$

$$= \boxed{} [N^2 + N^2 - \boxed{} + \boxed{} - 4N + \boxed{}]$$

$$= \boxed{} (3N^2 - \boxed{} + \boxed{})$$

उत्तर :

$$N^3 - (N - 2)^3$$

$$= [N - (\boxed{(N - 2)})] [N^2 + N \times \boxed{(N - 2)} + \boxed{(N - 2)^2}]$$

$$= \boxed{2} \left[N^2 + N^2 - \boxed{2N} + \boxed{N^2} - 4N + \boxed{4} \right]$$

$$= \boxed{2} (3N^2 - \boxed{6N} + \boxed{4})$$

8. खालील राशींचे अवयव चूक की बरोबर ते लिहा.

$$(1) 64x^3 - 27y^3 = (4x - 3y) (16x^2 - 12xy + 27y^3)$$

उत्तर : चूक

स्पष्टीकरण :

$$64x^3 - 27y^3$$

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

$$a^3 - b^3 = (a - b) (a^2 + ab + b^2) \dots\dots\dots(\text{सूत्र})$$

$$= (4x - 3y) [(4x)^2 + (4x) \times (3y) + (3y)^2]$$

$$= (4x - 3y) (16x^2 + 12xy + 9y^2)$$

$$(2) 128x^3 + 250y^3 = 2(4x + 5y)(16x^2 - 20xy + 25y^2)$$

उत्तर : बरोबर

स्पष्टीकरण :

$$128x^3 + 250y^3$$

$$= 2(64x^3 + 125y^3) \dots\dots\dots(2 \text{ सामाईक अवयव काढून})$$

$$a^3 + b^3 = (a + b) (a^2 - ab + b^2) \dots\dots\dots(\text{सूत्र})$$

$$= 2[(4x)^3 + (5y)^3]$$

$$= 2(4x + 5y) [(4x)^2 - (4x) \times (5y) + (5y)^2]$$

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

$$(3) x^3 + \frac{1}{x^3} = (x - \frac{1}{x}) (x^2 + 1 + \frac{1}{x^2})$$

उत्तर : चूक

स्पष्टीकरण :

$$x^3 + \frac{1}{x^3}$$

$$a^3 + b^3 = (a + b) (a^2 - ab + b^2) \dots\dots\dots(\text{सूत्र})$$

$$= \left(x + \frac{1}{x}\right) \left[(x)^2 - (x) \times \left(\frac{1}{x}\right) + \left(\frac{1}{x}\right)^2\right]$$

$$= \left(x + \frac{1}{x}\right) \left(x^2 - 1 + \frac{1}{x^2}\right)$$

$$(4) 1 - a^3 = (1 - a)(1 + a + a^2)$$

उत्तर : बरोबर

$$\text{स्पष्टीकरण : } 1 - a^3$$

$$= (1)^3 - (a)^3$$

$$a^3 - b^3 = (a - b) (a^2 + ab + b^2) \dots\dots\dots(\text{सूत्र})$$

$$= (1 - a)[(1)^2 + (1) \times (a) + (a)^2]$$

$$= (1 - a) (1 + a + a^2)$$

$$(5) 27x^3 - 8y^3 = (3x - 2y)(9x^2 + 6xy + 4y^2)$$

उत्तर : बरोबर

$$\text{स्पष्टीकरण : } 27x^3 - 8y^3$$

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

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2) \dots\dots\dots(\text{सूत्र})$$

$$= (3x - 2y)[(3x)^2 + (3x) \times (2y) + (2y)^2]$$

$$= (3x - 2y)(9x^2 + 6xy + 4y^2)$$

9. खालील जोड्या जुळवा.

A.

'अ' गट बहुपदी		'ब' गट बहुपदीचे अवयव	
(1)	$x^2 + 7x - 18$	(a)	$(x - 9)(x + 2)$
(2)	$x^2 + 3x - 18$	(b)	$(x + 9)(x - 2)$
(3)	$x^2 - 7x - 18$	(c)	$(x - 6)(x - 3)$
(4)	$x^2 - 9x + 18$	(d)	$(x + 6)(x - 3)$

उत्तर :

'अ' गट बहुपदी		'ब' गट बहुपदीचे अवयव	
(1)	$x^2 + 7x - 18$	(b)	$(x + 9)(x - 2)$
(2)	$x^2 + 3x - 18$	(d)	$(x + 6)(x - 3)$
(3)	$x^2 - 7x - 18$	(a)	$(x - 9)(x + 2)$
(4)	$x^2 - 9x + 18$	(c)	$(x - 6)(x - 3)$

B.

'अ' गट बहुपदी		'ब' गट बहुपदीचे अवयव	
(1)	$a^3 + b^3$	(a)	वर्ग त्रिपदी
(2)	$a^2 - b^2$	(b)	$(a + b) (a^2 - ab + b^2)$
(3)	$a^3 - b^3$	(c)	$(a - b) (a^2 + ab + b^2)$
(4)	$ax^2 + bx + c$	(d)	$(a + b) (a - b)$

उत्तर :

'अ' गट बहुपदी		'ब' गट बहुपदीचे अवयव	
(1)	$a^3 + b^3$	(b)	$(a + b) (a^2 - ab + b^2)$
(2)	$a^2 - b^2$	(d)	$(a + b) (a - b)$
(3)	$a^3 - b^3$	(c)	$(a - b) (a^2 + ab + b^2)$
(4)	$ax^2 + bx + c$	(a)	वर्ग त्रिपदी
