

Ex 12.2

① Simplify combining like terms:

समान पदों को जोड़कर सरल करें:

(i) $21b - 3a + 7b - 20b$

$$= 21b + 7b - 20b - 3a$$

$$= 8b - 3a$$

$$= 8b - 3a \quad \underline{\text{Ans}}$$

(ii) $-\frac{3}{2} + 13\frac{3}{2} - 52 + 72^3 - 152$

$$= 72^3 + 13\frac{3}{2} - \frac{3}{2} - 152 - 52$$

$$= 72^3 + 12\frac{3}{2} - 202 \quad \underline{\text{Ans}}$$

(iii) $p - (p - q) - q - (q - p)$

$$= p - p + q - q - q + p$$

$$= -q + p$$

$$= p - q \quad \underline{\text{Ans}}$$

(iv) $3a - 2b - ab - (a - b + ab) + 3ab + b - a$

$$= 3a - 2b - ab - a + b - ab + 3ab + b - a$$

$$= 3a - a - a - 2b + b + b - ab - ab + 3ab$$

$$= 3a - 2a - 2b + 2b - 2ab + 3ab$$

$$= a + ab \quad \underline{\text{Ans}}$$

(v) $5x^2y - 5x^2 + 3yx^2 - 3y^2 + x^2 - y^2 + 8xy^2 - 3y^2$

$$= 5x^2y + 3yx^2 + 8xy^2 - 5x^2 + x^2 - 3y^2 - 3y^2 - y^2$$

$$= 5x^2y + 3x^2y + 8xy^2 - 4x^2 - 6y^2 - y^2$$

$$= 8x^2y + 8xy^2 - 4x^2 - 7y^2 \quad \underline{\text{Ans}}$$

$$\begin{aligned}
 \text{(vi)} \quad & (3y^2 + 5y - 4) - (8y - y^2 - 4) \\
 &= 3y^2 + 5y - 4 - 8y + y^2 + 4 \\
 &= 3y^2 + y^2 + 5y - 8y - 4 + 4 \\
 &= 4y^2 - 3y \quad \underline{\underline{\text{Ans}}}
 \end{aligned}$$

② Add:
 जोड़:

$$\begin{aligned}
 \text{(i)} \quad & 3mn, -5mn, 8mn, -4mn \\
 & 3mn + (-5mn) + 8mn + (-4mn) \\
 &= 3mn - 5mn + 8mn - 4mn \\
 &= 3mn + 8mn - 5mn - 4mn \\
 &= 11mn - 9mn \\
 &= 2mn \quad \underline{\underline{\text{Ans}}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii)} \quad & t - 8t^2, 3t^2 - 2, 2 - t \\
 & t - 8t^2 + 3t^2 - 2 + 2 - t \\
 &= \cancel{t} - \cancel{t} - 8t^2 + 3t^2 - \cancel{2} + \cancel{2} \\
 &= -5t^2 \quad \underline{\underline{\text{Ans}}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(iii)} \quad & -7mn + 5, 12mn + 2, 9mn - 8, -2mn - 3 \\
 &= -7mn + 5 + 12mn + 2 + 9mn - 8 + (-2mn - 3) \\
 &= -7mn + 5 + 12mn + 2 + 9mn - 8 - 2mn - 3 \\
 &= -7mn + 12mn + 9mn - 2mn + 5 + 2 - 8 - 3 \\
 &= -7mn - 2mn + 21mn + 7 - 11 \\
 &= -9mn + 21mn - 4 \\
 &= 12mn - 4 \quad \underline{\underline{\text{Ans}}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(iv)} \quad & a+b-3, b-a+3, a-b+3 \\
 & a+b-3+b-a+3+a-b+3 \\
 & = \cancel{a} - \cancel{a} + a + b + \cancel{b} - \cancel{b} - \cancel{b} + \cancel{b} + 3 \\
 & = a+b+3 \quad \underline{\text{Ans}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(v)} \quad & 14x+10y-12xy-13, 18-7x-10y+8xy, 4xy \\
 & 14x+10y-12xy-13+18-7x-10y+8xy+4xy \\
 & = 14x-7x+10\cancel{y}-10\cancel{y}-12xy+8xy+4xy-13+18 \\
 & = 7x-12\cancel{xy}+8\cancel{xy}+4xy+5 \\
 & = 7x+5 \quad \underline{\text{Ans}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(vi)} \quad & 5m-7n, 3n-4m+2, 2m-3mn-5 \\
 & 5m-7n+3n-4m+2+2m-3mn-5 \\
 & = 5m-4m+2m-7n+3n-3mn+2-5 \\
 & = 7m-4m-4n-3mn-3 \\
 & = 3m-4n-3mn-3 \quad \underline{\text{Ans}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(vii)} \quad & 4x^2y, -3xy^2, -5xy^2, 5x^2y \\
 & 4x^2y+(-3xy^2)+(-5xy^2)+5x^2y \\
 & = 4x^2y-3xy^2-5xy^2+5x^2y \\
 & = 4x^2y+5x^2y-3xy^2-5xy^2 \\
 & = 9x^2y-8xy^2 \quad \underline{\text{Ans}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(viii)} \quad & 3p^2q^2-4pq+5, -10p^2q^2, 15+9pq+7p^2q^2 \\
 & 3p^2q^2-4pq+5+(-10p^2q^2)+15+9pq+7p^2q^2 \\
 & = 3p^2q^2-4pq+5-10p^2q^2+15+9pq+7p^2q^2 \\
 & = 3p^2q^2-10p^2q^2+7p^2q^2-4pq+9pq+5+15 \\
 & = -7p^2q^2+7p^2q^2+5pq+20 \\
 & = 5pq+20 \quad \underline{\text{Ans}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(ix)} \quad & ab - 4a, 4b - ab, 4a - 4b \\
 & ab - 4a + 4b - ab + 4a - 4b \\
 & = ab - ab - 4a + 4a + 4b - 4b \\
 & = 0 \quad \underline{\text{Ans}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(x)} \quad & x^2 - y^2 - 1, y^2 - 1 - x^2, 1 - x^2 - y^2 \\
 & x^2 - y^2 - 1 + y^2 - 1 - x^2 + 1 - x^2 - y^2 \\
 & = \cancel{x^2} - x^2 - \cancel{y^2} - y^2 - \cancel{1} + \cancel{y^2} - 1 - \cancel{1} + \cancel{1} \\
 & = -x^2 - y^2 - 1 \quad \underline{\text{Ans}}
 \end{aligned}$$

③ Subtract:
 24213

$$\begin{aligned}
 \text{(i)} \quad & -5y^2 \text{ from } y^2 \left[y^2 \text{ from } -5y^2 \right] \\
 & y^2 - (-5y^2) \\
 & = y^2 + 5y^2 \\
 & = 6y^2 \quad \underline{\text{Ans}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii)} \quad & 6xy \text{ from } -12xy \left[-12xy \text{ from } 6xy \right] \\
 & -12xy - 6xy \\
 & = -18xy \quad \underline{\text{Ans}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(iii)} \quad & (a-b) \text{ from } (a+b) \left[(a+b) \text{ from } (a-b) \right] \\
 & (a+b) - (a-b) \\
 & = a + b - a + b \\
 & = \cancel{a} - \cancel{a} + b + b \\
 & = 2b \quad \underline{\text{Ans}}
 \end{aligned}$$

$$\begin{aligned}
 \text{(iv)} \quad & a(b-5) \text{ from } b(5-a) \left[b(5-a) \text{ from } a(b-5) \right] \\
 & b(5-a) - a(b-5) \\
 & = 5b - ab - ab + 5a \\
 & = 5a + 5b - 2ab \quad \underline{\text{Ans}}
 \end{aligned}$$

$$(V) -m^2 + 5mn \text{ from } 4m^2 - 3mn + 8 \left[4m^2 - 3mn + 8 + \frac{5}{-1}(-m^2 + 5mn) \right]$$

$$\begin{aligned} & 4m^2 - 3mn + 8 - (-m^2 + 5mn) \\ &= 4m^2 - 3mn + 8 + m^2 - 5mn \\ &= 4m^2 + m^2 - 3mn - 5mn + 8 \\ &= 5m^2 - 8mn + 8 \text{ Ans } \end{aligned}$$

$$(vi) -x^2 + 10x - 5 \text{ from } 5x - 10 \left[5x - 10 + \frac{5}{-1}(-x^2 + 10x - 5) \right]$$

$$\begin{aligned} & 5x - 10 - (-x^2 + 10x - 5) \\ &= 5x - 10 + x^2 - 10x + 5 \\ &= x^2 + 5x - 10x - 10 + 5 \\ &= x^2 - 5x - 5 \text{ Ans } \end{aligned}$$

$$(vii) 5a^2 - 7ab + 5b^2 \text{ from } 3ab - 2a^2 - 2b^2 \left[3ab - 2a^2 - 2b^2 + \frac{5}{-1}(5a^2 - 7ab + 5b^2) \right]$$

$$\begin{aligned} & 3ab - 2a^2 - 2b^2 - (5a^2 - 7ab + 5b^2) \\ &= 3ab - 2a^2 - 2b^2 - 5a^2 + 7ab - 5b^2 \\ &= -2a^2 - 5a^2 - 2b^2 - 5b^2 + 3ab + 7ab \\ &= -7a^2 - 7b^2 + 10ab \text{ Ans } \end{aligned}$$

$$(viii) 4p^2 - 5q^2 - 3r^2 \text{ from } 5p^2 + 3q^2 - p^2 \left[5p^2 + 3q^2 - p^2 + \frac{5}{-1}(4p^2 - 5q^2 - 3r^2) \right]$$

$$\begin{aligned} & 5p^2 + 3q^2 - p^2 - (4p^2 - 5q^2 - 3r^2) \\ &= 5p^2 + 3q^2 - p^2 - 4p^2 + 5q^2 + 3r^2 \\ &= 5p^2 + 3p^2 + 3q^2 + 5q^2 - p^2 - 4p^2 \\ &= 8p^2 + 8q^2 - 5p^2 \text{ Ans } \end{aligned}$$

4 (a) what should be added to $x^2 + xy + y^2$ to obtain $2x^2 + 3xy$?

$2x^2 + 3xy$ वायाउ वगळ सवी $x^2 + xy + y^2$ दिवो वी नेकता बागीरा है?

let A should be added
ਮੰਨ ਲਓ A ਜੋੜਨਾ ਚਾਹੀਦਾ ਹੈ।

$$\therefore (x^2 + xy + y^2) + A = 2x^2 + 3xy$$

$$\begin{aligned} A &= 2x^2 + 3xy - (x^2 + xy + y^2) \\ &= 2x^2 + 3xy - x^2 - xy - y^2 \\ &= 2x^2 - x^2 + 3xy - xy - y^2 \\ &= x^2 + 2xy - y^2 \end{aligned}$$

$$\therefore \boxed{A = x^2 + 2xy - y^2} \quad \underline{\underline{\text{Ans}}}$$

(b) what should be subtracted from $2a + 8b + 10$ to get $-3a + 7b + 16$?

$-3a + 7b + 16$ ਤੋਂ $2a + 8b + 10$ ਤੋਂ ਕੀ ਘਟਾਈ?

let A should be subtracted
ਮੰਨ ਲਓ A ਘਟਾਉਣਾ ਚਾਹੀਦਾ ਹੈ।

$$\therefore 2a + 8b + 10 - A = -3a + 7b + 16$$

$$\Rightarrow 2a + 8b + 10 - (-3a + 7b + 16) = A$$

$$\Rightarrow 2a + 8b + 10 + 3a - 7b - 16 = A$$

$$\Rightarrow 2a + 3a + 8b - 7b + 10 - 16 = A$$

$$\Rightarrow 5a + b - 6 = A$$

$$\Rightarrow \boxed{A = 5a + b - 6} \quad \underline{\underline{\text{Ans}}}$$

⑤ what should be taken away from $3x^2 - 4y^2 + 5xy + 20$ to obtain $-x^2 - y^2 + 6xy + 20$?

$-x^2 - y^2 + 6xy + 20$ ੜੂੰ ਖੁਪਤ ਕਰਨ ਲਈ $3x^2 - 4y^2 + 5xy + 20$ ਵਿਚੋਂ ਕੀ ਕੱਢਣਾ ਪਵੇਗਾ?

Sol. Let A will be take away
ਮੈਨੂੰ ਲੱਭੋ A ਕੱਢਣਾ ਪਵੇਗਾ

$$\therefore 3x^2 - 4y^2 + 5xy + 20 - A = -x^2 - y^2 + 6xy + 20$$

$$\Rightarrow 3x^2 - 4y^2 + 5xy + 20 - (-x^2 - y^2 + 6xy + 20) = A$$

$$\Rightarrow 3x^2 - 4y^2 + 5xy + 20 + x^2 + y^2 - 6xy - 20 = A$$

$$\Rightarrow 3x^2 + x^2 - 4y^2 + y^2 + 5xy - 6xy + 20 - 20 = A$$

$$\Rightarrow 4x^2 - 3y^2 - xy = A$$

$$\Rightarrow \boxed{A = 4x^2 - 3y^2 - xy} \quad \underline{\text{Ans}}$$

⑥(a) From the sum of $3x - y + 11$ and $-y - 11$, subtract $3x - y - 11$

$3x - y + 11$ ਅਤੇ $-y - 11$ ਦੇ ਜੋੜ ਨੂੰ $3x - y - 11$ ੜੂੰ ਖੁਪਤ ਕਰੋ?

Sum of $3x - y + 11$ and $-y - 11$ [$3x - y + 11$ ਅਤੇ $-y - 11$ ਦਾ ਜੋੜ]

I

$$\begin{array}{r} 3x + y + 11 \\ -y - 11 \\ \hline 3x - 2y \end{array}$$

II

Subtract $3x - y - 11$ from $3x - 2y$ [$3x - 2y$ ਵਿਚੋਂ $3x - y - 11$ ੜੂੰ ਖੁਪਤ ਕਰੋ]

$$\begin{aligned} 3x - 2y - (3x - y - 11) \\ = 3x - 2y - 3x + y + 11 \\ = -y + 11 \quad \text{Ans} \end{aligned}$$

(b) From the sum of $4+3x$ and $5-4x+2x^2$, subtract the sum of $3x^2-5x$ and $-x^2+2x+5$

$4+3x$ ਅਤੇ $5-4x+2x^2$ ਦੇ ਜੋੜ ਨੂੰ $3x^2-5x$ ਅਤੇ $-x^2+2x+5$ ਦੇ ਜੋੜ ਤੋਂ ਘਟਾਓ।

I Sum of $4+3x$ and $5-4x+2x^2$ $\left[\begin{array}{l} 4+3x \text{ ਅਤੇ } 5-4x+2x^2 \\ \text{ਦਾ ਜੋੜ} \end{array} \right]$

$$\begin{aligned} & 4+3x+(5-4x+2x^2) \\ &= 4+3x+5-4x+2x^2 \\ &= 5+4+3x-4x+2x^2 \\ &= 9-x+2x^2 \end{aligned}$$

II Sum of $3x^2-5x$ and $-x^2+2x+5$ $\left[\begin{array}{l} 3x^2-5x \text{ ਅਤੇ } -x^2+2x+5 \\ \text{ਦਾ ਜੋੜ} \end{array} \right]$

$$\begin{aligned} & 3x^2-5x+(-x^2+2x+5) \\ &= 3x^2-5x-x^2+2x+5 \\ &= 3x^2-x^2-5x+2x+5 \\ &= 2x^2-3x+5 \end{aligned}$$

III $9-x+2x^2$ ਤੋਂ $2x^2-3x+5$ ਘਟਾਓ $\left(\begin{array}{l} \text{subtract} \\ 9-x+2x^2 \text{ from} \\ 2x^2-3x+5 \end{array} \right)$

$$\begin{aligned} & 9-x+2x^2-(2x^2-3x+5) \\ &= 9-x+2x^2-2x^2+3x-5 \\ &= 9-x+3x-5 \\ &= 9+2x-5 \\ &= 4+2x \end{aligned}$$