

Exercise - 12.2

1. Simplify combining like terms.

(i) $21b - 32 + 7b - 20$

Ans: - $28b - 52$

(ii) $-z^2 + 13z^2 - 5z + 7z^3 - 15z$

Ans: - $7z^3 + 12z^2 - 20z$

(iii) $P - (P - Q) - Q - (Q - P)$

Ans: - $\cancel{P} - \cancel{P} + \cancel{Q} - \cancel{Q} - Q + P$

$$P - Q$$

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

Ans: - $3a - 2b - ab - a + b - ab + 3ab + b - a$

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

$$= ab + 0 + (3a - 2a)$$

$$= ab + a$$

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

Ans: - $(5x^2y + 3x^2y) + (5x^2 + x^2) + (-3y^2 - 3y^2 - y^2)$

$$8x^2y + 6x^2 - 7y^2$$

(vi) $(3y^2 + 5y - 4) - (8y - y^2 - 4)$

Ans: - $3y^2 + 5y - 4 - 8y + y^2 + 4$

$$(3y^2 + y^2) + (5y - 8y)$$

$$4y^2 - 3y$$

(2) Add:

(i) $3mn, -5mn, 8mn, -4mn$

Ans: - $(3mn + 8mn) + (-5mn - 4mn)$

$$11mn - 9mn$$

$$2mn$$

(ii) $t - 8tz, 3tz - z, z - t$

Ans: - $(-8tz + 3tz) + (z - z) + (t - t)$

$$-5tz + 0 + 0$$

$$-5tz$$

(iii) $-7mn + 5, 12mn + 2, 9mn - 8, -2mn - 3$

Ans: - $(-7mn - 2mn) + (12mn + 9mn) + (5 + 2) + (-8 - 3)$

$$-9mn + 21mn + 7 - 11$$

$$12mn - 4$$

(iv) $a+b-3, b-a+3, a-b+3$

Ans: - $(\cancel{a}-\cancel{a}+a)+(\cancel{b}+\cancel{b}-\cancel{b})+(-\cancel{3}+\cancel{3}+3)$

$a+b+3$

(v) $14x+10y-12xy-13, 18-7x-10y+8xy, 4xy$

Ans: - $(14x-7x)+(\cancel{10y}-\cancel{10y})+(-12xy+8xy+4xy)-13$

$7x+(-12xy+12xy)-13$

$7x-13$

(vi) $5m-7n, 3n-4m+2, 2m-3mn-5$

Ans: - $-3mn+(5m-4m+2m)+(-7n+3n)+(2-5)$

$-3mn+3m-4n-3$

(vii) $4x^2y, -3xy^2-5xy^2, 5x^2y$

Ans: - $(4x^2y+5x^2y)+(-3xy^2-5xy^2)$

$9x^2y-8xy^2$

(viii) $3p^2q^2-4pq+5, -10p^2q^2, 15+9pq+7p^2q^2$

Ans: - $(3p^2q^2+7p^2q^2-10p^2q^2)+(-4pq+9pq)+(5+15)$

$(\cancel{10p^2q^2}-10p^2q^2)+5pq+20$

$5pq+20$

(ix) $ab-4a, 4b-ab, 4a-4b$

Ans:- $(ab-ab) + (-4a+4a) + (4b-4b)$

$= 0$

(x) $x^2-y^2-1, y^2-1-x^2, 1-x^2-y^2$

Ans:- $(\cancel{x^2} - \cancel{y^2} - 1 - \cancel{1} + \cancel{x^2} + \cancel{y^2} + 1 - x^2 - y^2)$
 $- (x^2 + y^2 + 1)$

③ Subtract:

(i) $-5y^2$ from y^2

Ans:- $y^2 - (-5y^2)$
 $y^2 + 5y^2$
 $6y^2$

(ii) $6xy$ from $-12xy$

Ans:- $-12xy - 6xy$
 $-18xy$

(iii) $(a-b)$ from $(a+b)$

Ans:- $a+b - a+b$
 $2b$

(iv) $a(b-5)$ from $b(5-a)$

Ans: - $b(5-a) - a(b-5)$

$$5b - \cancel{5a} - ab + \cancel{5a}$$

$$5b - ab$$

(v) $-m^2 + 5mn$ from $4m^2 - 3mn + 8$

Ans: - $4m^2 - 3mn + 8 - (-m^2 + 5mn)$

$$4m^2 - 3mn + 8 + m^2 - 5mn$$

$$(4m^2 + m^2) + (-3mn - 5mn) + 8$$

$$5m^2 - 8mn + 8$$

(vi) $-x^2 + 10x - 5$ from $5x - 10$

Ans: - $5x - 10 - (-x^2 + 10x - 5)$

$$5x - 10 + x^2 - 10x + 5$$

$$x^2 + (5x - 10x) + (-10 + 5)$$

$$x^2 - 5x - 5$$

(vii) $5a^2 - 7ab + 5b^2$ from $3ab - 2a^2 - 2b^2$

Ans: - $3ab - 2a^2 - 2b^2 - (5a^2 - 7ab + 5b^2)$

$$3ab - 2a^2 - 2b^2 - 5a^2 + 7ab - 5b^2$$

$$10ab - 7a^2 - 7b^2$$

(viii) $4PQ - 5Q^2 - 3P^2$ from $5P^2 + 3Q^2 - PQ$

$$\text{Ans:} - 5P^2 + 3Q^2 - PQ - (4PQ - 5Q^2 - 3P^2)$$

$$5P^2 + 3Q^2 - PQ - 4PQ + 5Q^2 + 3P^2$$

$$(5P^2 + 3P^2) + (3Q^2 + 5Q^2) + (-PQ - 4PQ)$$

$$8P^2 + 8Q^2 - 5PQ$$

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

$$\text{Ans:} - 2x^2 + 3xy - x^2 - xy - y^2$$

$$(2x^2 - x^2) + (3xy - xy) - y^2$$

$$x^2 + 2xy - y^2$$

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

$$\text{Ans:} - 2a + 8b + 10 - (-3a + 7b + 16)$$

$$(2a + 3a) + (8b - 7b) + (10 - 16)$$

$$5a + b - 6$$

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

Ans: - $3x^2 - 4y^2 + 5xy + 20 - (-x^2 - y^2 + 6xy + 20)$

$$3x^2 - 4y^2 + 5xy + 20 + x^2 + y^2 - 6xy - 20$$

$$(3x^2 + x^2) + (-4y^2 + y^2) + (5xy - 6xy) + (20 - 20)$$

$$4x^2 - 3y^2 - xy$$

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

Ans: - $3x - y + 11 + (-y - 11)$

$$3x - y - y + 11 - 11$$

$$3x - 2y$$

$$3x - 2y - (3x - y - 11)$$

$$3x - 3x - 2y + y + 11$$

$$-y + 11$$

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

Ans: - $4 + 3x + 5 - 4x + 2x^2$

$$2x^2 - x + 9$$

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

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

$$2x^2 - x + 9 - (2x^2 - 3x + 5)$$

$$\cancel{2x^2} - x + 9 - \cancel{2x^2} + 3x - 5$$

$$2x + 4$$